XK193

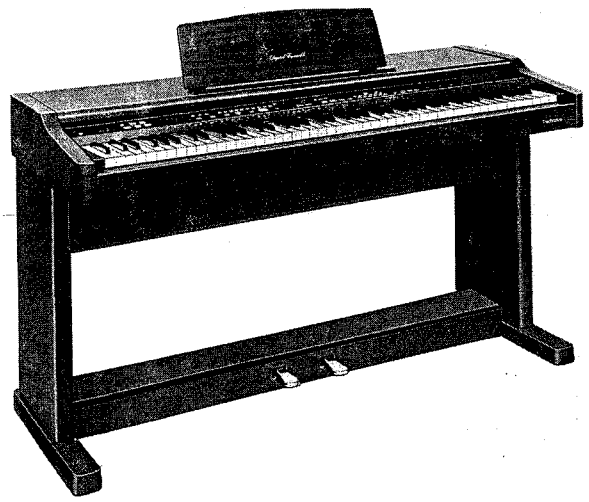
ORDER NO. EMID901304
A4 54 64

Service Manual

PCM Digital Ensemble

SX-PR50V

(M), (MC), (XM), (EN), (EH), (EF), (EZ), (EW), (EA), (EP), (EK), (XL), (XR), (XS), (XD), (X)



AREAS

(M):	U.S.A.	(EK):	the United Kingdom
(MC):	Canada	(XL):	New Zealand
(XM):	Mexico	(XR):	Australia
(EN):	Norway, Sweden, Denmark, Finland	(XS):	Malaysia, Singapore, South Africa
(EH):	Holland	(XD):	Saudi Arabia
(EF):	France, Italy, Belgium	(X):	the Middle East, Indonesia, Hong Kong, the Philippines, Thailand, Taiwan
(EZ):	Germany		
(EW):	Switzerland		
(EA):	Austria		
(EP):	Spain		

Specifications

KEYBOARD		88 KEYS
SOUND GENERATOR		PCM
MAXIMUM NUMBER OF NOTES PRODUCED SIMULTANEOUSLY		32 NOTES (A MAXIMUM OF 16 SIMULTANEOUSLY PRESSED KEYS CAN BE INPUT.)
SOUND SELECT	PIANO	GRAND PIANO, UPRIGHT PIANO, E PIANO 1, E PIANO 2
		E GRAND, HARPSICHORD, MALLET, GUITAR, FLUTE, SAX, BRASS, TRUMPET, ORGAN, STRINGS, ACOUSTIC BASS, ELECTRIC BASS (WITH VARIATION FOR EACH SOUND)
KEY SPLIT		○ (G2, C3, C4)
PEDAL		SUSTAIN, SOFT
DIGITAL CELESTE		○ (1, 2)
TRANSPOSE		○ (G~C~F♯)
RHYTHM	RHYTHM SELECT	MARCH, COUNTRY, WALTZ, SWING 1, SWING 2, DIXIE, JAZZ WALTZ, LATIN 1, LATIN 2, BOSSA NOVA, 8 BEAT, ROCK'N'ROLL, SHUFFLE, ROCK BALLAD, 16 BEAT 1, 16 BEAT 2, JAZZ ROCK, SWING ROCK, DISCO, LATIN ROCK (WITH VARIATION FOR EACH RHYTHM)
	CONTROL	START/STOP, SYNCHRO START, COUNT & FILL IN, INTRO & ENDING, TEMPO
	KEYBOARD PERCUSSION	34 KEYS
METRONOME		○ (1, 2)
ONE TOUCH PLAY		○
AUTO PLAY CHORD		BASIC SPLIT, ADVANCED SPLIT, PIANIST, PIANIST ACCOMP, ACCOMP PART 1, 2, 3
PANEL MEMORY		SET, 1~3
SEQUENCER		STORAGE CAPACITY: APPROX 2800 NOTES
		8 PARTS (RIGHT, LEFT, BASS, ACCOMP/CHORD 1, ACCOMP 2, 3, DRUMS, CONTROL) INPUT MODES: REAL TIME, STEP (ACCOMP 1/CHORD ONLY) EDIT FUNCTIONS: TRACK CLEAR, SONG CLEAR
COMPOSER		STORAGE CAPACITY: APPROX 1300 NOTES 5 PARTS (BASS, ACCOMP 1, 2, 3, DRUMS) MEMORY: 1~8 EDIT FUNCTIONS: COMPOSER CLEAR, BEAT, QUANTIZE, PERC ERASE (DRUMS ONLY)
DISPLAY		○
DEMO		○
CONTROL		MAIN VOLUME, BALANCE, TRANSPOSE/PROGRAM
TUNING		○ (± 50 CENTS)
MIDI		CHANNEL, OCTAVE SHIFT, LOCAL CONTROL, P. MEM P-CHANGE, START/STOP, MIDI CLOCK, SONG SELECT, MIDI LOAD, INPUT MODE, P-CHANGE MODE, NOTE ONLY, MIDI OUT, EXT SEQ MODE

Technics

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Division of Matsushita Electric
Corporation of America
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of Puerto Rico, Inc.
San Gabriel Industrial Park
65th Infantry Ave. Km. 9.5
Carolina, P.R. 00630

5464

OTHERS	OCTAVE SHIFT, REVERB DEPTH, ACCOMP VOLUME, PIANO TUNING, TOUCH SENSITIVITY, PEDAL SETTING, P. MEM EXPAND, MIN RANGE, MEDLEY, DISK FORMAT, INITIAL
EXTERNAL MEMORY	DIGITAL DISK RECORDER (OPTIONAL)
TERMINALS	HEADPHONE TERMINALS × 2, LINE OUT, AUX IN, MIDI (IN, THRU, OUT)
OUTPUT	20 W × 2
SPEAKERS	16 cm × 2, 6.5 cm × 2, MONITOR SPEAKER × 2
POWER REQUIREMENT	175 W, 110 W (NORTH AMERICA AND MEXICO)
	AC120/220/240 V 50/60 Hz, AC120 V 60 Hz (NORTH AMERICA AND MEXICO) AC220 V 50/60 Hz (NEDERLANDS)
DIMENSIONS (WXHXD)	135.9 cm × 79.6 cm × 56.5 cm (53-1/2" × 31-11/32"× 22-1/4")
NET WEIGHT	60 kg (132.3 lbs.)
ACCESSORIES	DUST COVER, STAND, AC CORD

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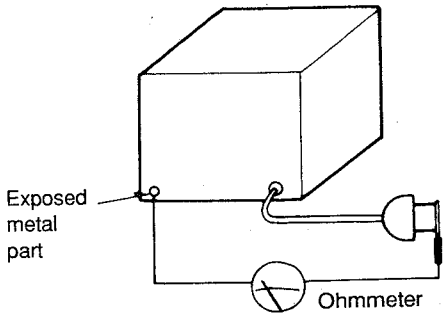
SAFETY PRECAUTION (This "safety precaution" is for the U.S.A. only)

• Safety Precaution

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

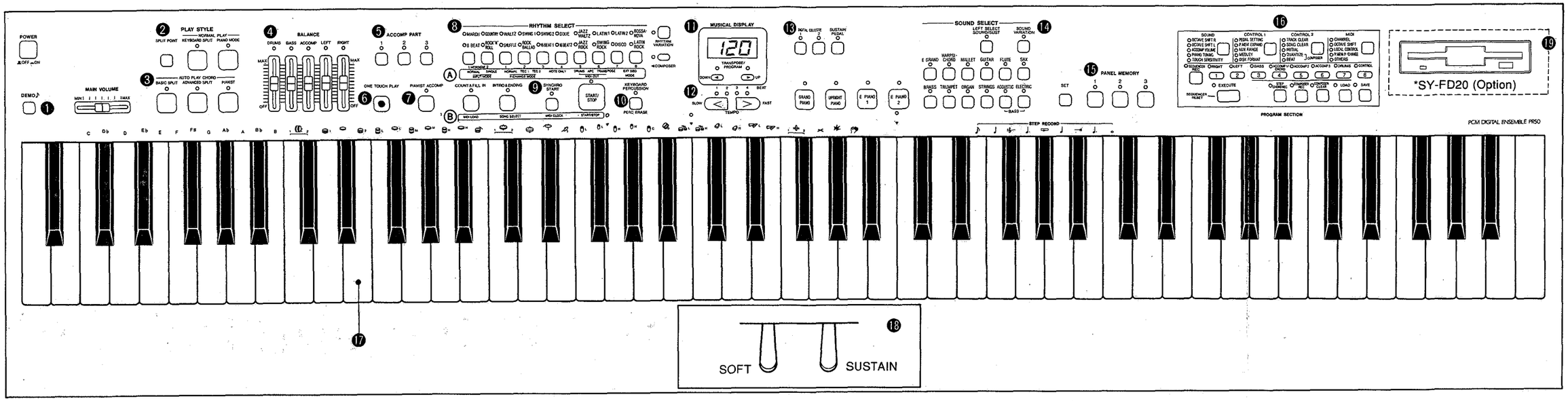
• Insulation Resistance Test

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw heads, connectors, control shafts, handle brackets, etc. Measurements should range from 4 MΩ to infinity for all exposed parts.



Resistance=4 MΩ to ∞

ARRANGEMENT OF CONTROL PANEL



BASIC FUNCTIONS

❶ DEMO ♪
Pre-recorded performances are used to demonstrate the individual appeal of each basic rhythm and sound.

❷ PLAY STYLE
When playing as a piano, select either a conventional keyboard or a split keyboard. The location of the split point can be set at G2, C3 or G3 with the **SPLIT POINT** button.

❸ AUTO PLAY CHORD
When you play a chord on the keyboard, an accompaniment pattern which matches the selected rhythm is automatically produced. Select from three modes, according to your level of expertise.

❹ BALANCE
The volumes for the **DRUMS**, **BASS**, **ACCOMP**, **LEFT** and **RIGHT** parts are adjusted with their respective **BALANCE** controls.

❺ ACCOMP PART
The **AUTO PLAY CHORD** automatic accompaniment is comprised of three **ACCOMP** parts—**1**, **2** and **3**—which you can turn on and off individually.

❻ ONE TOUCH PLAY
With this special feature, you select a rhythm, and appropriate sounds and effects are automatically set in seconds.

❼ PIANIST ACCOMP
This is a totally new feature which automatically regulates the sound and rhythms of the **AUTO PLAY CHORD** accompaniment so that your piano performance stands out.

❽ RHYTHM SELECT
Various automatic rhythm patterns are stored in the permanent memory, for each of which a **RHYTHM VARIATION** is available. Two **METRONOME** types are also available.

❾ Rhythm control
The **COUNT & FILL IN** button is used to begin with a one-measure count or to insert a fill-in pattern during the rhythm performance. Use the **INTRO & ENDING** button to start a song with an intro pattern or finish with an ending pattern. **START/STOP** is used to start and stop the rhythm instantly. Or turn on the **SYNCHRO START** button to start the rhythm by pressing a key on the left side of the keyboard. Regulate the speed of the automatic rhythm with the **TEMPO** buttons. **BEAT** indicators light to show the beat.

❿ KEYBOARD PERCUSSION
One press of the **KEYBOARD PERCUSSION** button transforms your keyboard into a whole band of percussive instruments and special sounds. The keys are picture-coded for quick and easy selection.

⓫ MUSICAL DISPLAY
During the normal performance mode, the tempo is displayed. During other modes, the **MUSICAL DISPLAY** is a multi-function indicator, used when setting the transposed key, to show the remaining memory in the **SEQUENCER** or **COMPOSER**, when setting the time signature or **QUANTIZE** level for the **COMPOSER**, when adjusting or selecting various programmable functions, and to show various messages when using the Digital Disk Recorder.

⓬ TRANSPOSE
C is the standard setting, but you can raise or lower the key of the entire keyboard in semi-tone steps across an entire octave.

⓭ EFFECTS
DIGITAL CELESTE gives the sound a thickness and diffusion; **SUSTAIN PEDAL** controls the enable/disable status of the sustain pedal.

⓮ SOUND SELECT
Select from four piano-type sounds when playing as a standard piano, or choose one of the many non-piano sounds. A **SOUND VARIATION** is available for each non-piano sound.

⓯ PANEL MEMORY
Set the desired sounds, effects, split point, volume settings, rhythm, tempo, etc. with the panel controls. Then store the panel settings in one of the programmable memories. Then while you play, the touch of one button recalls the panel settings instantly.

⓰ PROGRAM SECTION
Open the sliding cover to use the multi-purpose **PROGRAM SECTION**. These buttons are used when setting the functions for the **SEQUENCER**, **COMPOSER** or MIDI, when using some of the Digital Disk Recorder functions, and when custom-setting any of the numerous programmable functions.

⓱ Keyboard
This keyboard features Touch Response, by which you control the volume by playing the keys harder or softer.

⓲ Pedals
The sustain pedal apply sustain effects, and the soft pedal works as a damper.

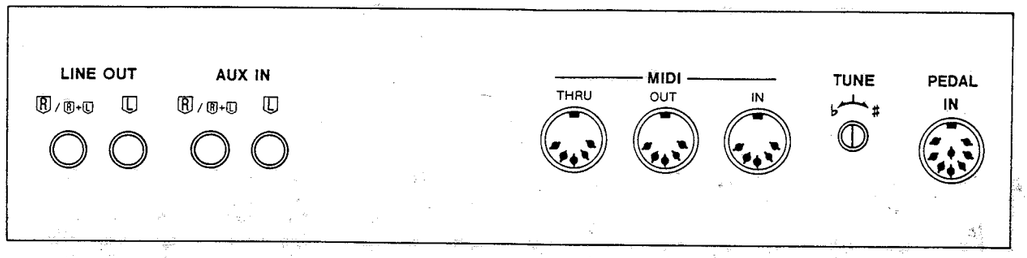
⓳ Digital Disk Recorder SY-FD20 (option)
The Digital Disk Recorder allows you to store up to 20 performances on a memory disk.

Initialization

The following procedure resets all programmable settings, functions and memories to their initialized (factory-preset) status. Use this procedure if the buttons, keys, etc. malfunction, or when you wish to reset the memories ands functions.

<Procedure>
1. Turn off the **POWER** button.
2. While pressing the three leftmost buttons in the **RHYTHM SELECT** section (**METRONOME 1**, **METRONOME 2** and **1**) at the same time, turn the **POWER** button on again.

CONNECTION TERMINALS



TUNE
During an ensemble performance with other instruments, fine adjustments of pitch can be made using this knob. The center position is standard pitch (A=440 Hz). The pitch is adjustable in a range of ±50 cents.

PEDAL IN
Connect the cord from the included stand to this terminal.

AUX IN (input level 500 mV, 33 kΩ)
Other instruments such as a rhythm machine or sound module can be connected to the piano so that the sound is output from the piano. To receive monaural sound, connect the other instrument to the **R/R+L** terminal. (Do not connect the **L** terminal.)

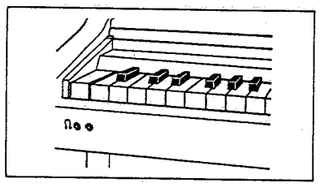
LINE OUT (output level 1.5 V 600 Ω)
By plugging into an external high-power amplifier, the sound can be reproduced at a high volume. Or connect a tape recorder and use them as recording terminals. To output monaural sound, connect the external equipment to the **R/R+L** terminal. (Do not connect the **L** terminal.)

MIDI (Musical Instrument Digital Interface)
MIDI is the standard specification that enables connection to equipment such as synthesizers and personal computers. Data transmission and reception are possible between the Technics Digital Ensemble and instruments provided with MIDI terminals.

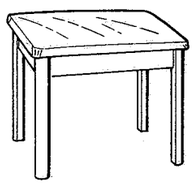
IN: The terminal that receives data from external equipment.
OUT: The terminal that transmits data from the piano to external equipment.
THRU: The terminal that transfers data from the IN terminal directly to other equipment.

- Use a 5-pin DIN cord (less than 15m long) for these connections.

PHONES (∩) × 2
For silent practice, headphones may be used. When plugged in, the speaker system is automatically switched off, and sound is heard only through the headphones.

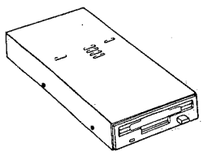


OPTIONS

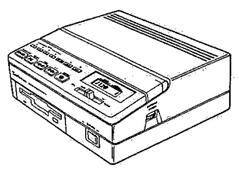


SZ-CP3
Bench

SZ-CP4M
Bench



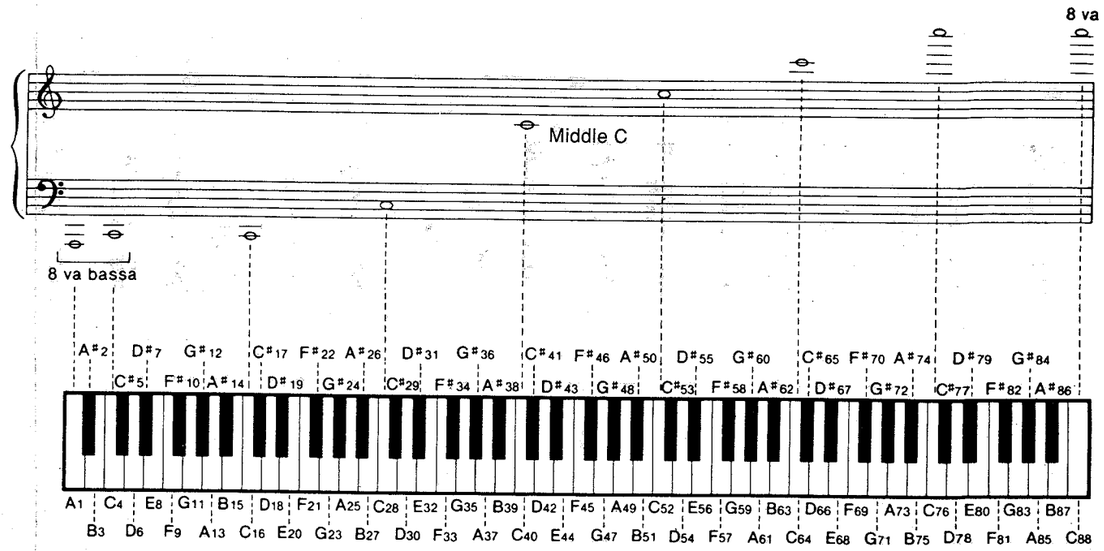
SY-FD20
Digital Disk Recorder



SY-MQ8
MIDI Sequencer

KEYBOARD RANGES

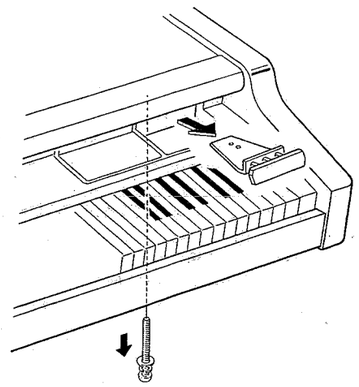
- This keyboard features Touch Response, by which you control the volume by playing the keys harder or softer.



INSTALLATION OF SY-FD20 (OPTION)

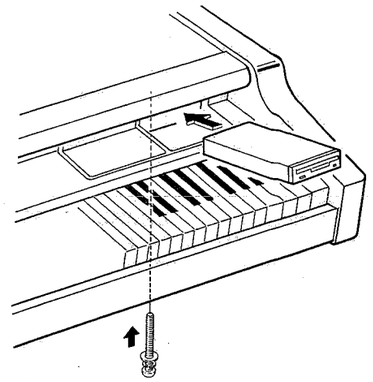
1. Make sure that the power to the Digital Ensemble is turned off.

2. Remove the screw from under the right side of the keyboard. The cover can now be removed from the Digital Disk Recorder compartment.



[Fig. 1]

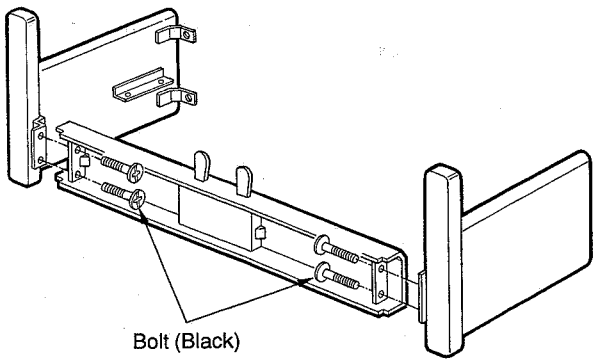
3. Insert the Digital Disk Recorder into the compartment opening and push it in firmly as far as it will go. Secure the Digital Disk Recorder with the screw that you removed in step 2.



[Fig. 2]

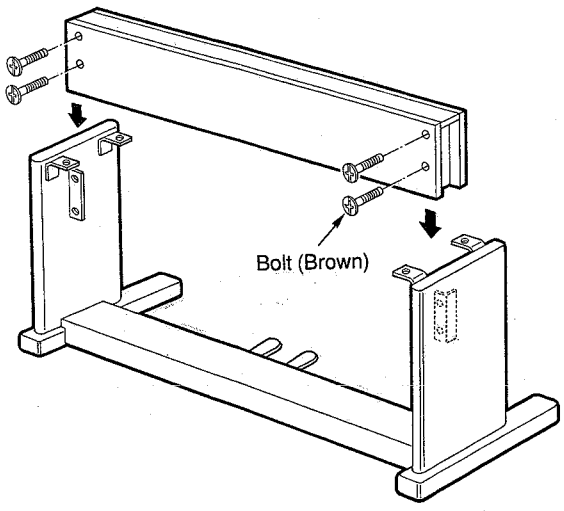
HOW TO ASSEMBLE THE PIANO

1 Assemble the side panels and the pedal box using the 4 black bolts.



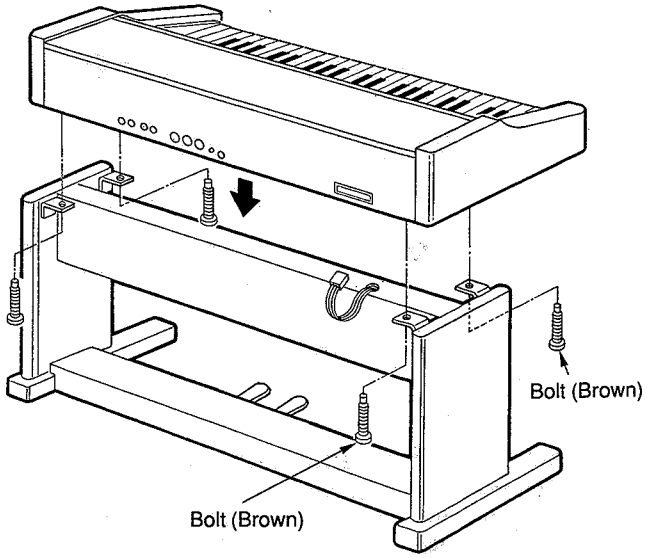
[Fig. 3]

2 Place the stand upright and mount the speaker box onto the L-shaped brackets with 4 brown bolts.



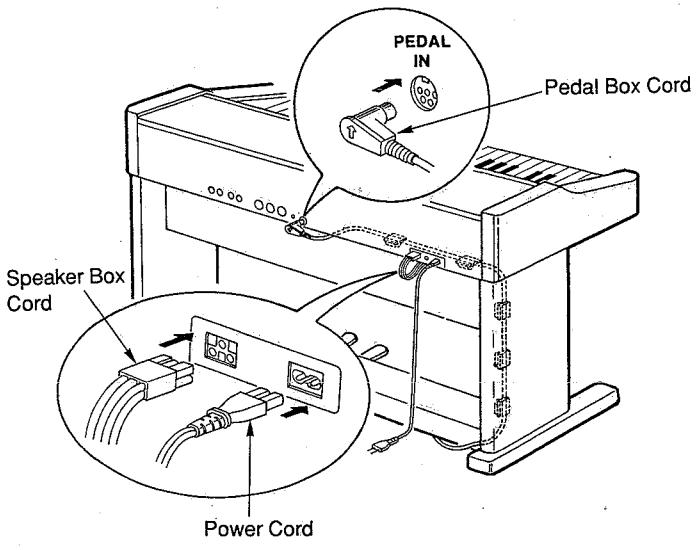
[Fig. 4]

3 Place the piano unit on the stand and secure it to the stand with 4 brown bolts.



[Fig. 5]

4 Connect the pedal box cord and speaker box cord to their respective sockets located on the rear of the piano unit as shown below.

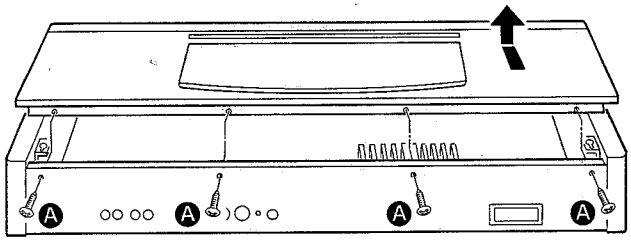


[Fig. 6]

DISASSEMBLY INSTRUCTIONS

1 Removing the top cover (Fig. 7)

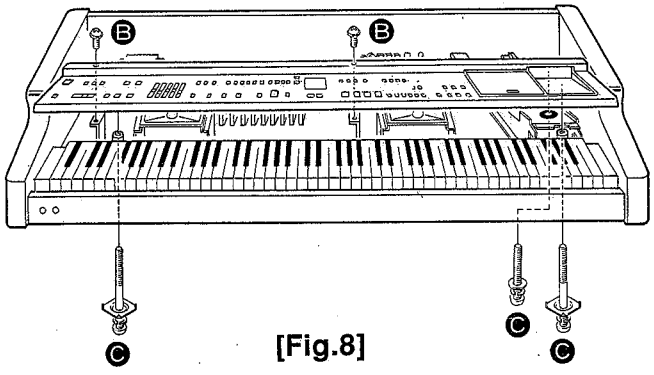
1. Remove the top cover affixing screws (Ⓐ 4 pcs.).
2. Slide the top cover forward and lift up (as shown by the arrows).



[Fig. 7]

2 Removing the control panel (Fig. 8)

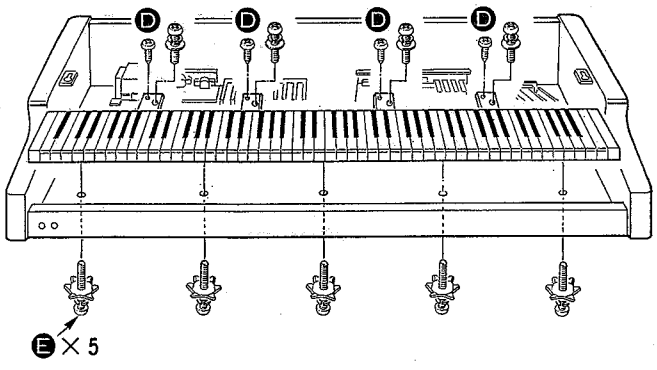
1. Remove the top cover. (See Step 1.)
2. Remove the control panel affixing screws (Ⓑ 2 pcs. and Ⓒ 3 pcs.).
3. Remove the control panel as shown in Figure 8.



[Fig.8]

3 Removing the keyboard assembly (Fig. 9)

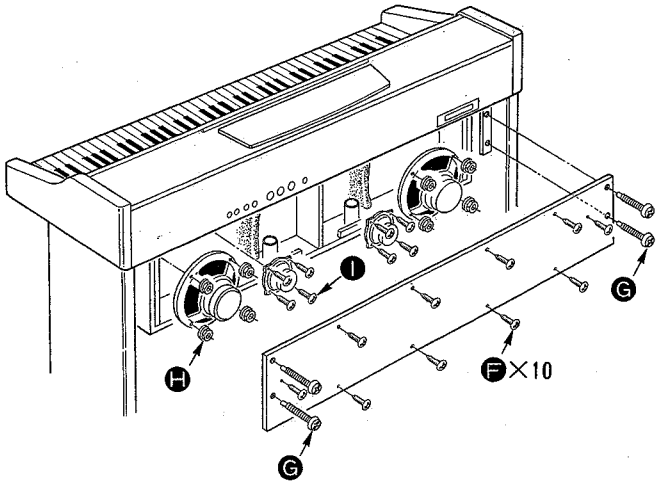
1. Remove the top cover. (See Step 1.)
2. Remove the metal fittings affixing screws (Ⓓ 8 pcs.).
3. Remove the keyboard assembly affixing screws located on the bottom of the cabinet (Ⓔ 5 pcs.).



[Fig. 9]

4 Removing the speakers (Fig. 10)

1. Remove the mounting screws for the rear board of the speaker box (Ⓕ 10 pcs. and Ⓖ 4 pcs.).
   - Be careful that the speaker box does not fall off, since it comes free of the L-bracket of the stand.
2. Remove the mounting nuts for the 16 cm speakers (Ⓗ 4 pcs. each).
3. Remove the mounting screws for the 6.5 cm speakers (Ⓘ 4 pcs. each).

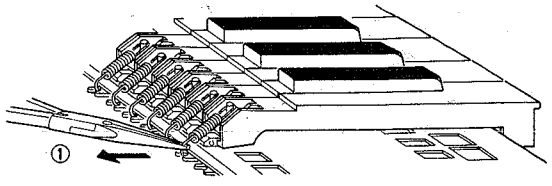


[Fig. 10]

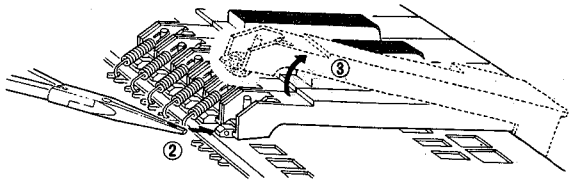
5 Key(s)

1. Remove the keyboard from the cabinet. (See Step 3.)
2. Remove the spring from the key as shown Fig. 11.
3. Pushing friction piece of key as shown Fig. 12. Key can be removed from chassis.
4. Lift up the key and take it out from chassis.

NOTE:
In the case of disassembly black key remove the right and left white key at first and after that black key can be rmoved.



[Fig. 11]



[Fig. 12]

6 Removing the printed circuit boards

MAIN P.C.B.

1. Remove the top cover. (See Step 1.)
2. Remove the MAIN P.C.B. mounting screws on the rear panel (Ⓙ 2 pcs.).
3. Release the 2 claws of the P.C.B. holder to remove the MAIN P.C.B.

AS P.C.B.

1. Remove the top cover. (See Step 1.)
2. Remove the AS P.C.B. mounting screws (Ⓚ 2 pcs.).
3. Release the 2 claws of P.C.B. holder to remove the AS P.C.B.

HP P.C.B.

1. Remove the keyboard assembly. (See Step 3.)
2. Remove the HP P.C.B. mounting screws (Ⓛ 2 pcs.).

ACP P.C.B.

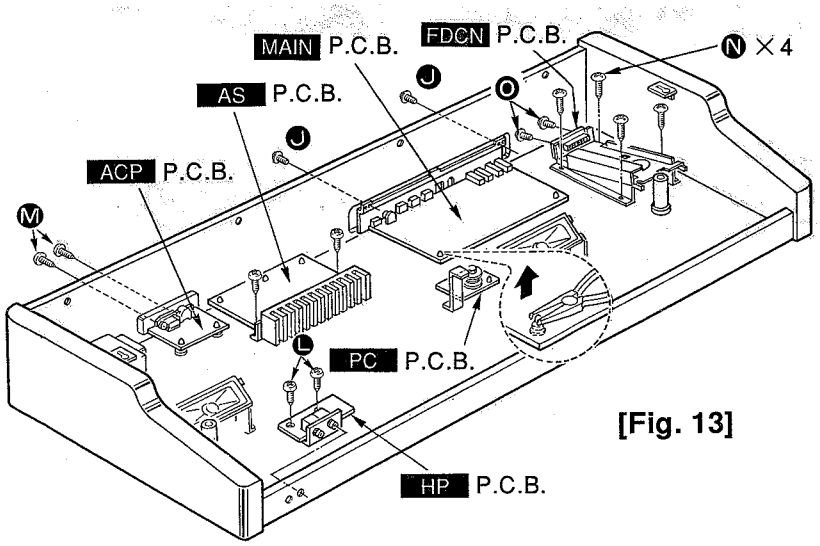
1. Remove the top cover. (See Step 1.)
2. Remove the ACP P.C.B. mounting screws on the rear panel (Ⓜ 2 pcs.).
3. Release the 2 claws of the P.C.B. holder to remove the ACP P.C.B.

PC P.C.B.

1. Remove the top cover. (See Step 1.)
2. Release the 3 claws of P.C.B. holder to remove the PC P.C.B.

FDCN P.C.B.

1. Remove the top cover and control panel. (See Steps 1 and 2.)
2. Remove the chassis on which FDCN P.C.B. is attached and then remove (Ⓝ 4 pcs. and Ⓞ 2 pcs.).



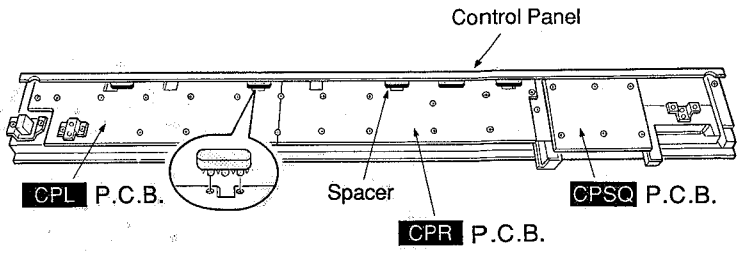
[Fig. 13]

CPL CPR CPSQ P.C.B.

1. Remove the control panel. (See Step 2.)
2. Remove the control panel P.C.B. mounting screws and spacers.

NOTE:

- When installing the CPL and CPR P.C.B.'s, be sure to affix the spacers, as shown in Figure 14.



[Fig. 14]

MEASUREMENTS AND ADJUSTMENTS

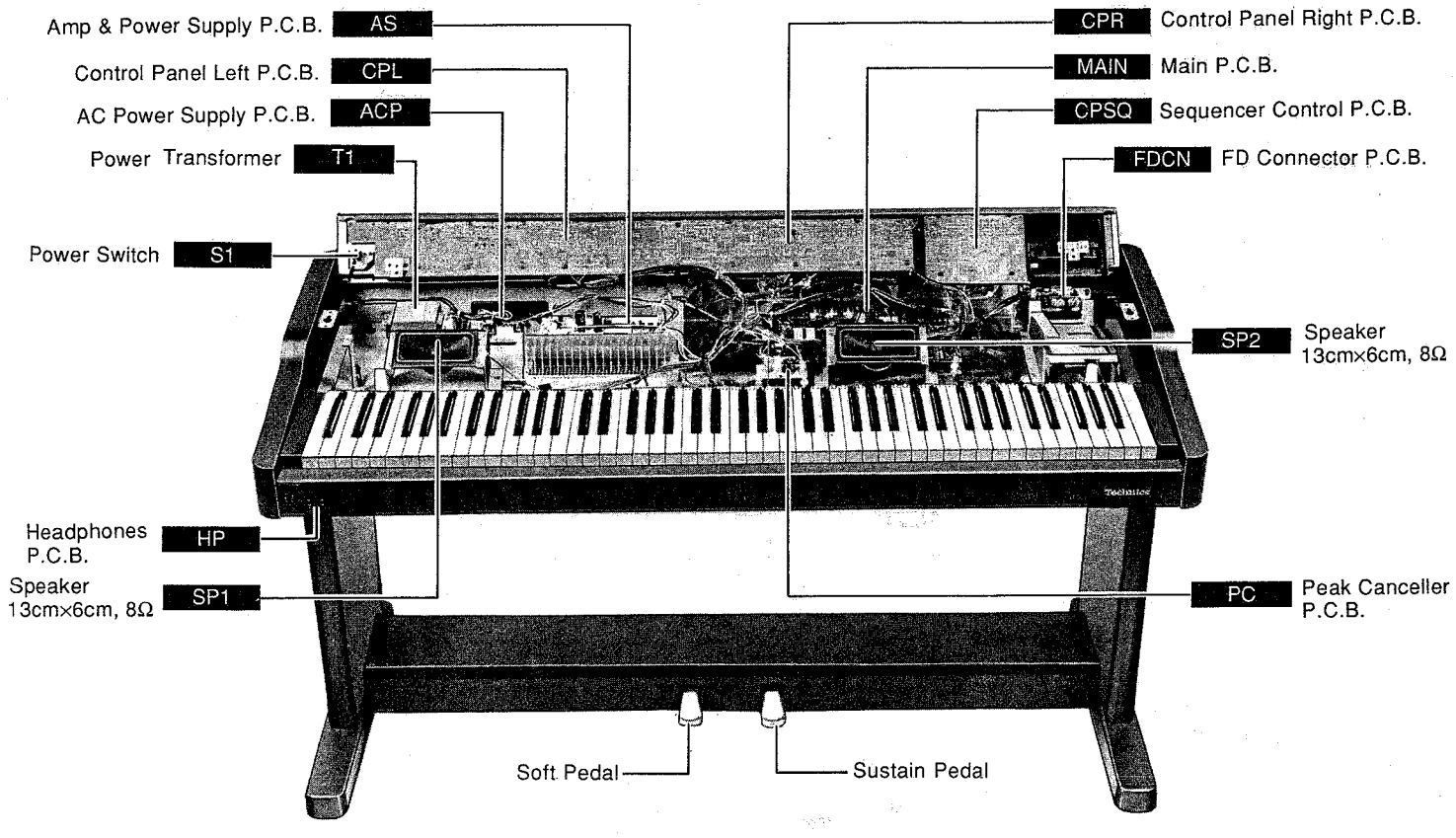
■ Measuring Equipment

- Oscilloscope 20 MHz, 1:1 probe

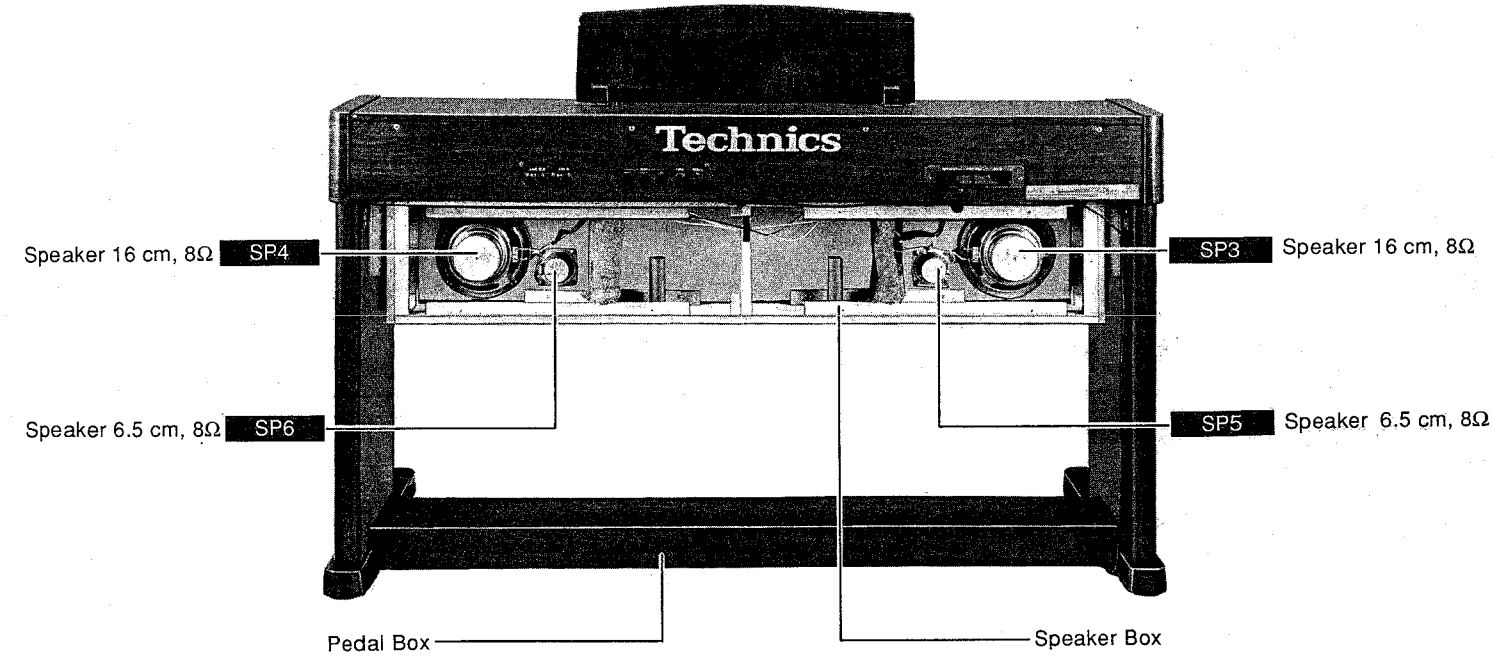
ADJUSTMENT	MEASURING CONDITIONS	EQUIPMENT	ADJUSTMENT P.C.B.	ADJ. POINT	CONNECT POINT	READING
D/A Converter offset	any position	Oscilloscope	MAIN P.C.B.	VR2	IC21-① pin	0 V ±5 mV

1. Set the oscilloscope voltage division to 5 mV/cm (Use the 1:1 oscilloscope probe) and connect the oscilloscope probe to MAIN P.C.B. IC21 Pin ①.
2. Turn VR2 to adjust the voltage to zero.

PARTS LOCATION



[Photo-1]



[Photo-2]

ERROR DISPLAY

When using the Digital Disk Recorder (sold separately) any of the following error messages may appear on the display. If an error message appears, follow the appropriate steps to remedy the problem.

Display	Remedy
Er 0	The memory disk has not been formatted by the Digital Disk Recorder. • Insert a correctly formatted disk.
Er 1	Loading failure. • Perform the loading procedure again.
Er 2	No memory disk in the Digital Disk Recorder. • Insert a memory disk.
Er 3	You have attempted to load a song number which has not been saved. • Load a song number which has been saved.
Er 4	No Digital Disk Recorder. • Install the SY-FD20.
Er 5	Saving failure. • Perform the saving procedure again.
Er 6	The memory disk is write-protected. • Close the write-protect window of the disk.
Er 7	No remaining memory storage capacity. • Insert a new disk, perform the saving procedure after formatting it.
Er 8	Formatting failure. • Perform the formatting procedure again.
Er 9	You have attempted to save a song which is copy-protected. • A copy-protected song cannot be saved.
E 13	The **SEQUENCER** does not function because the **EXT SEQ MODE** is on. • Set the **EXT SEQ MODE** to off.

Warning:

- Some pre-recorded disks (for example, those recorded by the manufacturer) are copy-protected. Data from these disks cannot be copied.
- When the power is turned off after a copy-protected song has been loaded, the **SEQUENCER** contents will be erased.
- If a copy-protected song has been loaded and you want to then record a new song in the **SEQUENCER** and save it on a disk, be sure to first turn the power off once or perform the initialization procedure.

SYMPTOMS WHICH APPEAR TO BE SIGNS OF TROUBLE

The following changes in performance may occur in the Digital Ensemble but do not indicate trouble.

	Phenomenon	Remedy
Sounds and effects	The buttons, keys, etc. malfunction.	• Turn off the **POWER** button once, then turn it on again. If this procedure is not successful, turn off the **POWER** button once. Then, while pressing the three leftmost buttons in the **RHYTHM SELECT** section (**METRONOME 1**, **METRONOME 2** and **1**) at the same time, turn the **POWER** button on again. (Note that, in this case, all programmable settings, functions and memories return to their factory-preset status.)
	No sound is produced when the keys are pressed.	• The **MAIN VOLUME** is at the minimum setting. Adjust the volume with the **MAIN VOLUME** control. • The **DEMO** ♪ button is on, and " _ _ _ " is shown on the display. Press the **DEMO** ♪ button to turn it off. The display returns to the tempo display. • The **BALANCE** volumes are set to **OFF**. Use the sliding **BALANCE** controls to set the volumes of the relevant parts to appropriate levels. • The local control for a part performed on the keyboard is set to off. Set the local control to on.
	The octave is higher or lower for some **SOUND SELECT** sounds.	• An octave change is programmed for some instrument sounds in order to make them easy to play. This is not a malfunction.
	Only percussive instrument sounds are produced when the keyboard is played.	• The **KEYBOARD PERCUSSION** button is on. Turn it off to return the keyboard to the normal sound.
	The sustain does not work even when the sustain pedal is depressed.	• When the **SUSTAIN PEDAL** button is off, the sustain does not work even when the pedal is depressed. Turn on the **SUSTAIN PEDAL** button.
	The soft pedal do not operate properly. For example, when the soft pedal is depressed, the rhythm starts or a fill-in is played.	• Different functions can be programmed in this pedal. You can return the pedal to its original function by turning off the instrument once, or by using the **PEDAL SETTING** mode.
Rhythm	The rhythm does not start.	• The **DRUMS** volume in the **BALANCE** section is set to **OFF**. Use the sliding **BALANCE** control to set the **DRUMS** volume to an appropriate level. • In the **RHYTHM SELECT** section, a **COMPOSER** number button with no stored performance was selected. Change the rhythm or store a new rhythm pattern in the **COMPOSER**. • When a **SEQUENCER** part button (in the **PROGRAM SECTION**) is on, the rhythm will not start unless the rhythm has been stored. Turn off the **SEQUENCER** part buttons. • The MIDI clock is set to the external clock. Set the MIDI clock to the internal clock.
	The only rhythm produced is a hi-hat and bass drum sound.	• This is the rhythm sound produced when the **KEYBOARD PERCUSSION** button is on. When the **KEYBOARD PERCUSSION** button is turned off, the rhythm returns to normal.
AUTO PLAY CHORD	No sound is produced for the automatic accompaniment, or only the sounds of some parts are produced.	• The **BALANCE** volumes are set to **OFF**. Use the sliding **BALANCE** controls to set the volumes of the relevant parts to appropriate levels. • An **ACCOMP** part does not sound if its corresponding **ACCOMP PART 1, 2** or **3** button is off. Press the desired **ACCOMP PART 1, 2** and **3** buttons to turn them on. • An **ACCOMP** part does not sound if its volume is set to 0. The volume of each **ACCOMP** part can be adjusted independently.

	Phenomenon	Remedy
SEQUENCER	Storage is not possible.	• The remaining storage capacity of the **SEQUENCER** memory is 0. Use the **TRACK CLEAR** or **SONG CLEAR** function to erase the memory. • The MIDI **EXT SEQ MODE** is set to on. Set it to off.
	Multi-track storage is not possible.	• The playback track has been selected, but the **START/STOP** button has not been pressed. A flashing track indicator shows the track which is ready for recording, and a lit track indicator shows a track which is ready for playback. To record one track while listening to another (playback) track, press the **START/STOP** button to begin playback.
	A previously stored song is played back.	• The tracks of a song which was previously stored have not been cleared. Use the **TRACK CLEAR** or **SONG CLEAR** function to erase the memory before recording a new song.
COMPOSER	Storage is not possible.	• The remaining storage capacity of the **COMPOSER** memory is 0. Erase a **COMPOSER** number button in the **RHYTHM SELECT** section in which a pattern is stored.
	The playback timing of the rhythm pattern is different from the timing with which it was stored.	• The **QUANTIZE** function was on when the pattern was recorded. (The default setting is " 1 6 ".) Set the **QUANTIZE** function to " O F F ".
	Setting the time signature is not possible.	• The time signature cannot be changed for a pattern which is currently stored in the **COMPOSER**. When storing in the **COMPOSER** and " A L L " appears on the display, press the **COMPOSER CLEAR** button to erase the previously stored rhythm pattern.
	When editing a preset rhythm, the drums sound is not erased even when the **PERC ERASE** button is pressed.	• Some of the drums sounds of preset rhythm patterns cannot be erased. Follow the **COMPOSER CLEAR** procedure.
Digital Disk Recorder (optional)	The Digital Disk Recorder produces a noise during recording or playback.	• This occurs when the Digital Disk Recorder is reading a disk. It does not indicate a problem.
	When the operation to load from a memory disk is performed, the contents of the **SEQUENCER** are erased.	• When performing the load operation from a memory disk, the **SEQUENCER** memory changes to that of the data loaded from the memory disk. If you wish to preserve a song which is stored in the **SEQUENCER** memory, save it in a memory disk before performing the load procedure.

MIDI IMPLEMENTATION CHART

Digital Ensemble

[SX-PR50V/SX-PR150/SX-PR250/SX-PR350] **(Transmitted)**

Function		RIGHT	LEFT	ACCOMP 1	ACCOMP 2	ACCOMP 3	BASS	DRUMS	CONTROL	Remarks
Basic Channel	Default	1~16	1~16	1~16	1~16	1~16	1~16	1~16	1~16	memorized
	Changed	1~16	1~16	1~16	1~16	1~16	1~16	1~16	1~16	
Mode	Default	3	3	3	3	3	3	3	3	OMNI OFF POLY MODE
	Messages	×	×	×	×	×	×	×	×	
	Altered	—	—	—	—	—	—	—	—	
Note Number		31~102	31~102	31~102	31~102	31~102	31~102	36~69**	—	Changes depending on the position of the transpose control.
	True voice	—	—	—	—	—	—	—	—	
Velocity	Note ON	○	○	○	○	○	○	○	—	
	Note OFF	× (9nH:v=0)	× (9nH:v=0)	× (9nH:v=0)	× (9nH:v=0)	× (9nH:v=0)	× (9nH:v=0)	× (9nH:v=0)	—	
After Touch	Key's	×	×	×	×	×	×	×	×	
	Ch's	×	×	×	×	×	×	×	×	
Pitch Bender		×	×	×	×	×	×	×	×	
Control Change	7	○	○	○	○	○	○	○	○	volume (MAIN VOLUME)
	64	○	○	○	○	○	○	×	×	sustain
	66	○	○	×	×	×	×	×	×	sostenuto pedal
	67	○	○	○	○	○	○	×	×	soft pedal
	80	×	○	×	×	×	×	×	×	auto play chord
	82	×	×	×	×	×	×	○	×	intro & ending, fill in
	83	○	○	×	×	×	×	×	×	octave shift
	93	○	×	×	×	×	×	×	×	chorus (DIGITAL CELESTE 1)
	94	○	×	×	×	×	×	×	×	celeste (DIGITAL CELESTE 2)
Prog Change		○	○	○	○	○	○	○	×	
	True #	—	—	—	—	—	—	—	—	
System exclusive		×								
System common	Song Pos	×								
	Song Sel	*○× (0~19)								
	Tune	×								
System Real Time	Clock	○								
	Commands	* ○ ×								start/stop, continue
Aux Messages	Local ON/OFF	×	×	×	×	×	×	×	—	
	All notes OFF	○	○	○	○	○	○	○	—	
	Active Sense	○								
	Reset	×								
Notes	* ○ × .....Whether or not the data for each of these items is transmitted can be set. **When the program change mode is set to **TEC** (on), note numbers for **DRUMS** differ.									

Mode 1: OMNI ON, POLY **Mode 2:** OMNI ON, MONO ○: Yes

Mode 3: OMNI OFF, POLY **Mode 4:** OMNI OFF, MONO ×: No

Digital Ensemble
[SX-PR50V/SX-PR150/SX-PR250/SX-PR350] **(Recognized)**

Function		RIGHT	LEFT	ACCOMP 1	ACCOMP 2	ACCOMP 3	BASS	DRUMS	CONTROL	Remarks
Basic Channel	Default	1~16	1~16	1~16	1~16	1~16	1~16	1~16	1~16	memorized
	Changed	1~16	1~16	1~16	1~16	1~16	1~16	1~16	1~16	
Mode	Default	3	3	3	3	3	3	3	3	OMNI OFF POLY MODE
	Messages	×	×	×	×	×	×	×	×	
	Altered	—	—	—	—	—	—	—	—	
Note Number		0~127	0~127	0~127	0~127	0~127	0~127	36~69**	—	Changes depending on the sound.
	True voice	36~119	36~119	36~119	36~119	36~119	24~107	36~69	—	
Velocity	Note ON	○	○	○	○	○	○	○	—	
	Note OFF	×	×	×	×	×	×	×	—	
After Touch	Key's	×	×	×	×	×	×	×	×	
	Ch's	×	×	×	×	×	×	×	×	
Pitch Bender		○	○	○	○	○	○	×	×	
Control Change	7	○	○	○	○	○	○	○	○	volume (MAIN VOLUME)
	64	○	○	○	○	○	○	×	×	sustain
	66	○	○	×	×	×	×	×	×	sostenuto pedal
	67	○	○	○	○	○	○	×	×	soft pedal
	80	×	○	×	×	×	×	×	×	auto play chord
	82	×	×	×	×	×	×	○	×	intro & ending, fill in
	83	○	×	×	×	×	×	×	×	octave shift
	93	○	×	×	×	×	×	×	×	chorus (DIGITAL CELESTE 1)
	94	○	×	×	×	×	×	×	×	celeste (DIGITAL CELESTE 2)
Prog Change		0~15 (PR50V/PR150)	0~15 (PR50V/PR150)	0~15 (PR50V/PR150)	0~15 (PR50V/PR150)	0~15 (PR50V/PR150)	0~15 (PR50V/PR150)	0~29		
	True #	0~21 (PR250/PR350)	0~21 (PR250/PR350)	0~21 (PR250/PR350)	0~21 (PR250/PR350)	0~21 (PR250/PR350)	0~21 (PR250/PR350)			
System exclusive		×								
System common	Song Pos	×								
	Song Sel	*○× (0~19)								
	Tune	×								
System Real Time	Clock	○								
	Commands	* ○ ×								start/stop, continue
Aux Messages	Local ON/OFF	×	×	×	×	×	×	×	—	
	All notes OFF	○	○	○	○	○	○	○	—	
	Active Sense	○								
	Reset	×								
Notes		* ○ × .....Whether or not the data for each of these items is transmitted can be set. **When the program change mode is set to **TEC** (on), note numbers for **DRUMS** differ.								

Mode 1: OMNI ON, POLY **Mode 2:** OMNI ON, MONO
Mode 3: OMNI OFF, POLY **Mode 4:** OMNI OFF, MONO

○: Yes
×: No

PRECAUTIONS BEFORE SERVICING

■ Precautions for measuring of the output waveforms.

1. The waveform was measured by "National Digital Storage Oscilloscope VP-5730A". Therefore the waveforms of musical tone signals shown may differ somewhat due to variation of timing of triggering.
2. Since the 1/10 test probe is used, the indicated voltage value on the bottom part of each waveform photo is 1/10 of the actual value (e.g. 0.2V/cm should be 2.0V/cm).
3. This Digital Ensemble has a touch sensitivity type keyboard. Therefore the touch sensor level must be set to "0" level when checking waveform measurements after activating the initial setting.
   - Initial setting method
   (1) Turn off the **POWER** button.
   (2) While pressing the three leftmost buttons in the **RHYTHM SELECT** section (**METRONOME 1**, **METRONOME 2** and **1**) at the same time, turn the **POWER** button on again.
   - Touch sensitivity setting method
   (1) Select "TOUCH SENSITIVITY" in the **PROGRAM SECTION** with the **SOUND** button.
   (2) Adjust the touch sensitivity level to "0" with the **TRANSPOSE/PROGRAM** button.
   (3) Press the **SOUND** button again to set the level.

■ Important safety notice:

Components identified by a ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only the manufacturer's specified parts.

■ Symbolic marks

The symbolic marks for resistors and capacitors used in these circuits are classified following TABLE-1 and TABLE-2.

1. RESISTORS
   - Resistors without a symbolic mark are FIXED CARBON FILM RESISTORS (ERD-type).
   - All resistors are 1/4 WATT, ±5% TOLERANCE unless otherwise designated in the schematic diagrams.

(TABLE-1)

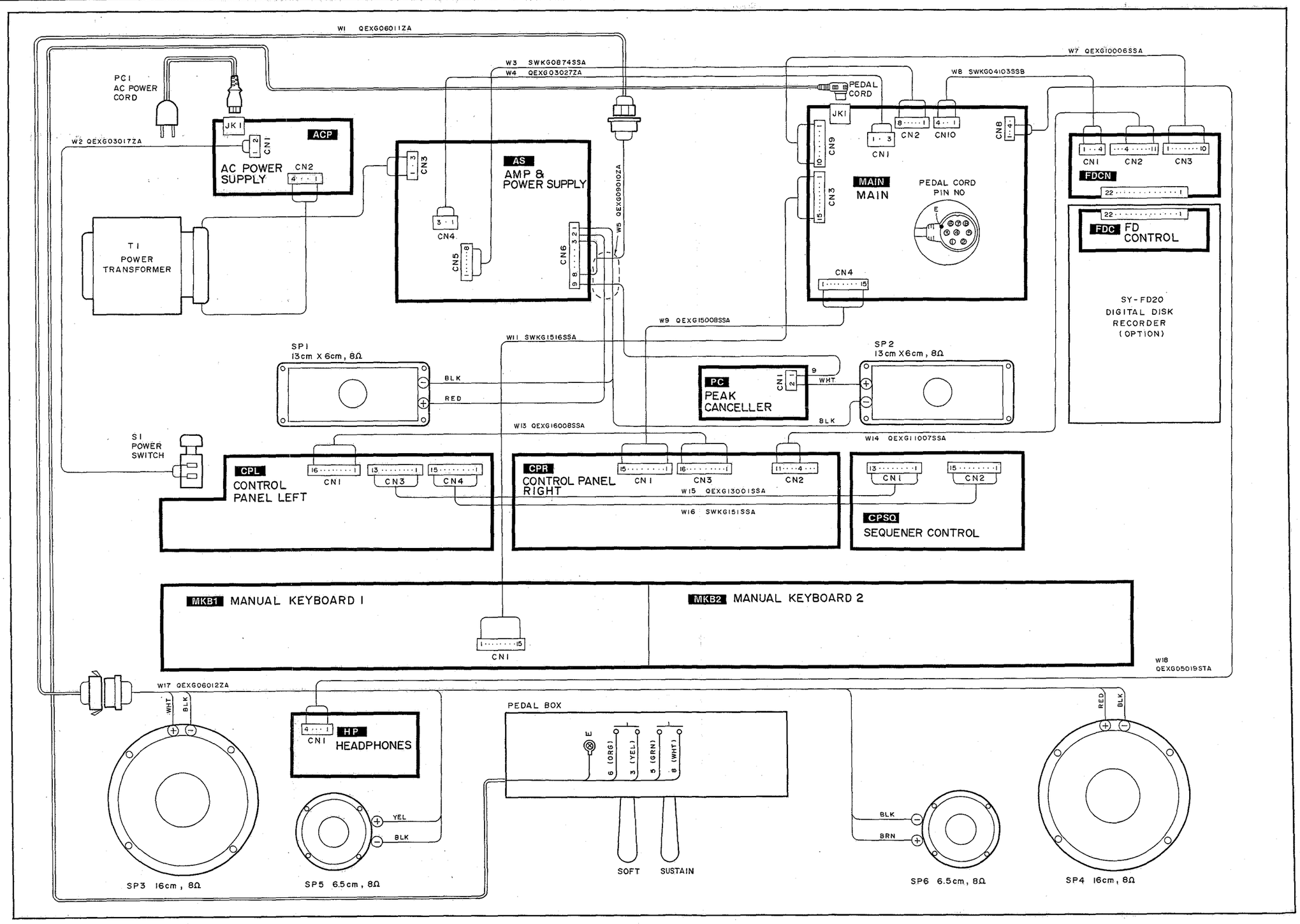
SYMBOL	SPECIFICATION	SYMBOL	SPECIFICATION
Ⓕ	Fixed Carbon Film Resistors "FLAME-PROOF" (ERD__F__type)	Ⓕ	Fixed Metal Film Resistors "FLAME-PROOF" (ERX__type)
Ⓕ	Fixed Wire Wound Resistors "FLAME-PROOF" (ERF__type)	[F]	Fuse Type Fixed Metal Oxide Film Resistors "FLAME-PROOF" (ERQ__type)
Ⓕ	Fixed Metal Oxide Film Resistors "FLAME-PROOF" (ERG__type)	[F]	Fuse Type Fixed Carbon Film Resistors "FLAME-PROOF" (ERD2FC__type)
Ⓖ	Fixed Metal Film Resistors (Precision and High Stability) (ERO__type)		

2. CAPACITORS
   - Capacitors without a symbolic mark are POLYESTER CAPACITORS. (ECQM-type, ECQG-type, ±10% Tolerance)
   - Polarized capacitors without a symbolic mark are Aluminum Electrolytic Capacitors. (ECEA-type,±20% Tolerance)

(TABLE-2)

SYMBOL	SPECIFICATION	TYPE
Ⓝ	Non-Polarized Electrolytic Capacitors	ECEA__KN__type
Ⓨ	Non-Polarized Electrolytic (for Network System)	ECEA__Y__type
Ⓜ	Aluminum Electrolytic Capacitors (Low leakage current type)	ECEA__M__type
Ⓩ	Aluminum Electrolytic Capacitors (Low impedance type)	ECEA__Z__type
Ⓣ	Tantalum Solid Electrolytic Capacitors	ECS__type
Ⓣ	Metalized Plastic Film Capacitors (TF Series)	ECQV__type
Ⓣ	Polyester Film Capacitors	ECQB__type
○	Temperature Compensating Ceramic Capacitors	ECC__type
○	High-Dielectric Constant Ceramic Capacitors	ECK__type ECR__type
○	Ceramic Capacitors (Cylinder type)	ECBA__type
	Metalized Polyester Film Capacitors for Across the Line	ECQ__EW__type
	Aluminum Electrolytic Capacitors for Smoothing Circuit	ECES__type

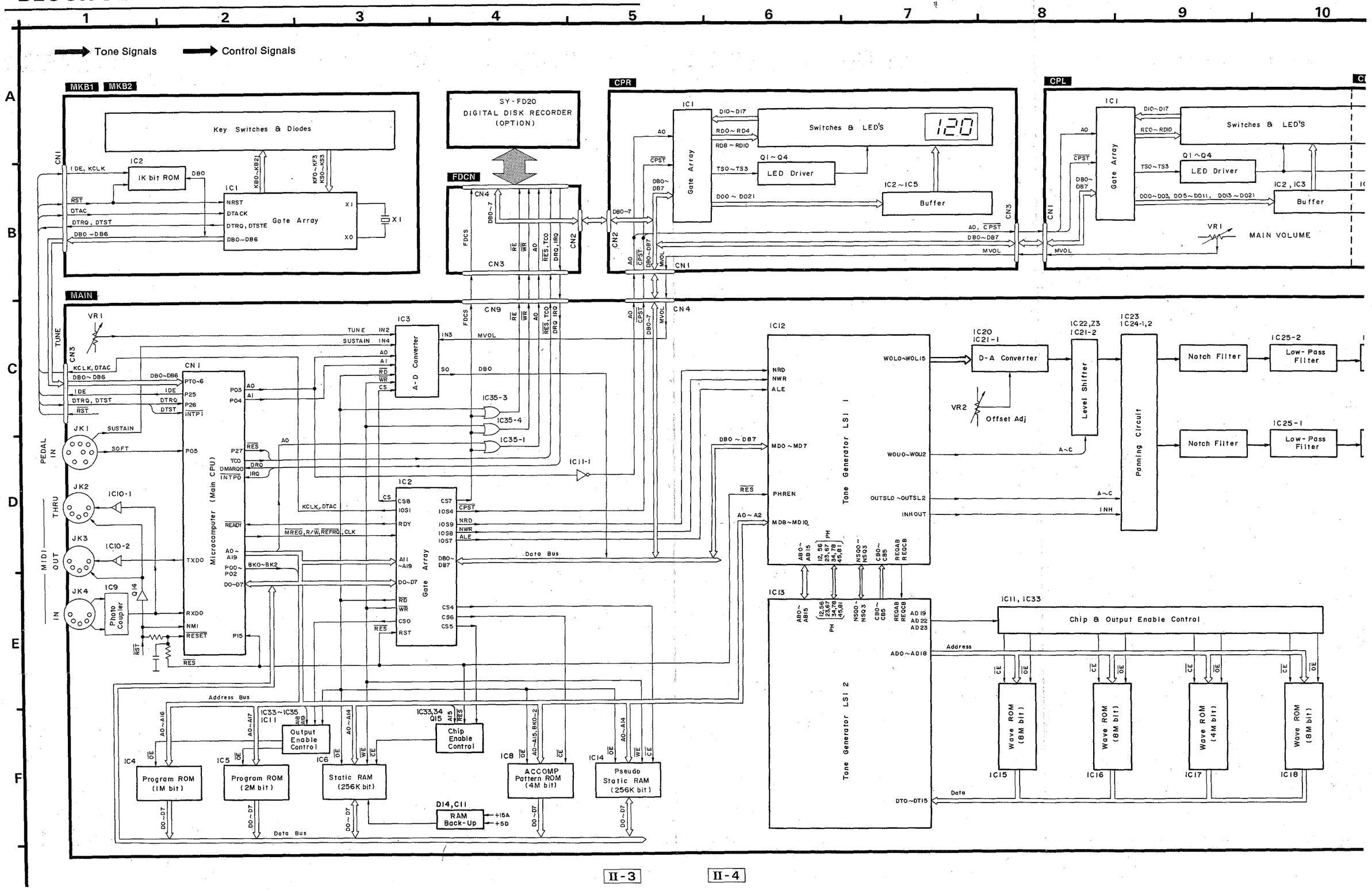
WIRING CONNECTION DIAGRAM

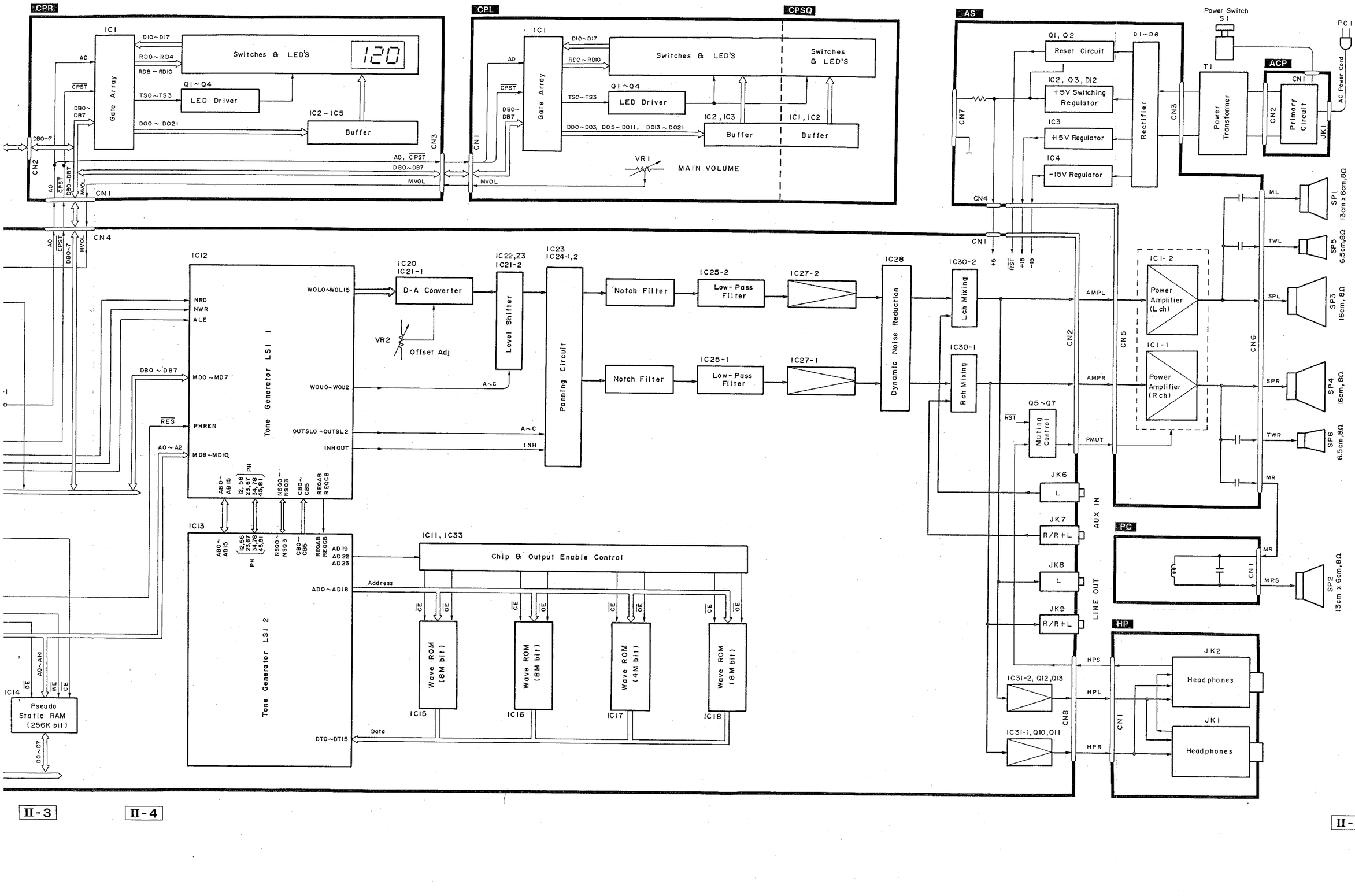


II-1

II-2

BLOCK DIAGRAM




CPR
IC1
D10~D17
A0
RD0~RD4
RD8~RDI0
Switches & LED'S
120
Gate Array
CPST
Q1~Q4
LED Driver
TS0~TS3
DB0~DB7
D00~D021
IC2~IC5
Buffer
CN3
DB0~7
CN2
A0
CPST
DB0~DB7
MVOL
CN1
CPL
CPSQ
RC0~RDI0
IC2, IC3
IC1, IC2
D00~D03, D05~D011, D013~D021
VR1
MAIN VOLUME
AS
Power Switch
S1
PC1
AC Power Cord
Q1, Q2
Reset Circuit
D1~D6
IC2, Q3, DI2
+5V Switching Regulator
IC3
+15V Regulator
IC4
-15V Regulator
Rectifier
CN7
CN4
T1
Power Transformer
ACP
CN2
Primary Circuit
JK1
+5
RST
+15
-15
IC12
Tone Generator LSI 1
NRD
NWR
ALE
DB0 ~ DB7
MD0 ~ MD7
RES
PHREN
A0 ~ A2
MD8~MD10
WOL0~WOL15
WOU0~WOU2
OUTSL0 ~OUTSL2
INHOUT
IC20
IC21-1
D-A Converter
VR2
Offset Adj
IC22,Z3
IC21-2
Level Shifter
A~C
IC23
IC24-1,2
Panning Circuit
INH
IC25-2
Low-Pass Filter
IC27-2
IC25-1
IC27-1
Notch Filter
IC28
Dynamic Noise Reduction
IC30-2
Lch Mixing
IC30-1
Rch Mixing
AMPL
AMPR
Q5~Q7
Muting Control
PMUT
CN2
CN5
CN6
IC1-2
Power Amplifier (Lch)
IC1-1
Power Amplifier (Rch)
ML
TWL
SPL
SPR
TWR
MR
SP1 13cm x 6cm,8Ω
SP5 6.5cm,8Ω
SP3 16cm, 8Ω
SP4 16cm, 8Ω
SP6 6.5cm,8Ω
JK6
JK7
JK8
JK9
L
R/R+L
AUX IN
LINE OUT
PC
MRS
SP2 13cm x 6cm,8Ω
HP
JK2
Headphones
JK1
HPS
HPL
HPR
IC31-2, Q12,Q13
IC31-1, Q10,Q11
CN8
CN1
IC13
Tone Generator LSI 2
AB0~AB15
12,56 23,67 34,78 45,81
PH
NSA0~NSA3
CB0~CB5
REQAB REQCB
AD19 AD22 AD23
AD0~AD18
IC11, IC33
Chip & Output Enable Control
Address
Wave ROM (8M bit)
Wave ROM (8M bit)
Wave ROM (4M bit)
Wave ROM (8M bit)
IC15
IC16
IC17
IC18
Data
DT0~DT15
IC14
Pseudo Static RAM (256K bit)
OE
WE
CE
A0~A14
D0~D7

II-3 II-4 II-5

MAIN AND HEADPHONES CIRCUIT BOARD

* Main P.C.B. comparison chart by area.

Area	P.C.B. No.	Q8, 9	R171~R175	JP Ⓐ	J15, J16, JP Ⓑ	W1, 2
[M] [XM]	SXPG204381	○	○	×	○	○
[EZ] [MC] [XL]	SXPG2043171	×	×	×	○	×
Other areas	SXPG204341					

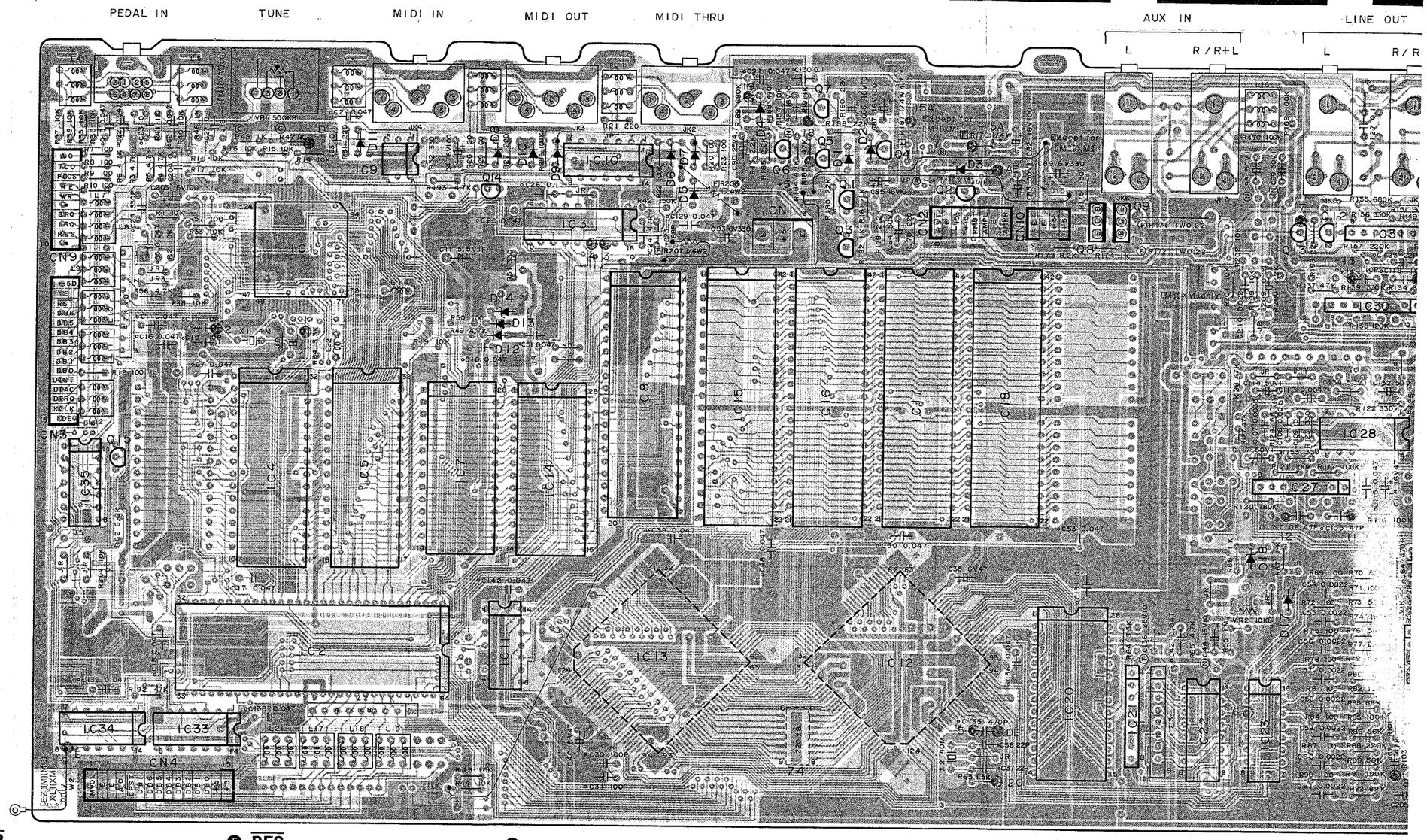
MAIN MAIN CIRCUIT BOARD

Circuit view on top of P.C.B.

• [M] [XM] areas **SXPG204381**

• [EZ] [MC] [XL] areas **SXPG2043171**

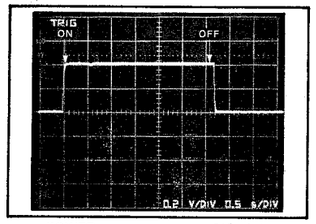
• Other **SX**



■ Waveform measurement

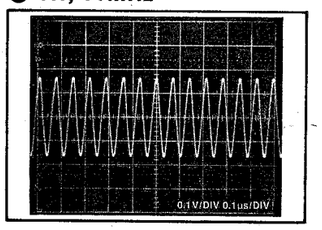
1. Activate the initial setting method. (Refer to page I-15)
2. Set the touch sensitivity level to the "0". (Refer to page I-15)
3. Set the D. Piano to required mode following each check point(s).

❶

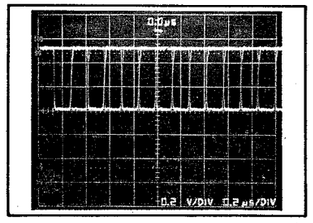


• POWER.....ON→OFF

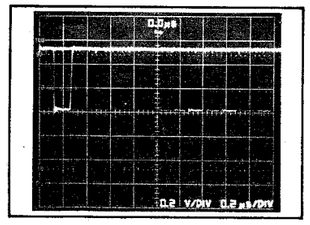
❷ X1, 14MHz



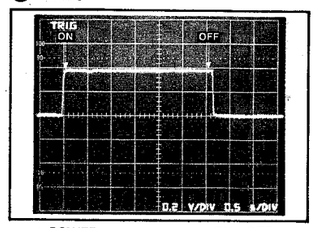
❸ $\overline{RD}$



❹ $\overline{WR}$

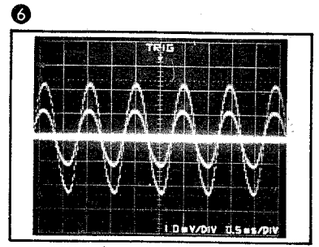


❺ $\overline{RES}$



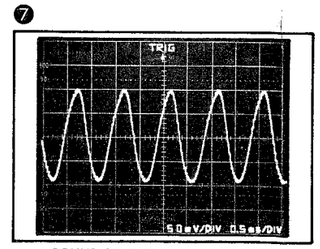
• POWER.....ON→OFF

❻



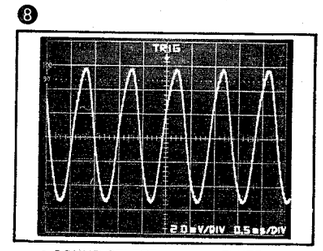
• SOUND SELECT.....FLUTE
• BALANCE (RIGHT).....MAX
• MAIN VOLUME.....MAX
• Keyboard.....C_{52} Key

❼



• SOUND SELECT.....FLUTE
• BALANCE (RIGHT).....MAX
• MAIN VOLUME.....MAX
• Keyboard.....C_{52} Key

❽



• SOUND SELECT.....FLUTE
• BALANCE (RIGHT).....MAX
• MAIN VOLUME.....MAX
• Keyboard.....C_{52} Key

❾

• SOUN
• BALA
• MAIN
• Keybo

ARD

＊Main P.C.B. comparison chart by area.

Area	P.C.B. No.	Q8, 9	R171~R175	JP Ⓐ	J15, J16, JP Ⓑ	W1, 2
[M] [XM]	SXPG204381	○	○	○	×	○
[EZ] [MC] [XL]	SXPG2043171	×	×	×	○	×
Other areas	SXPG204341					

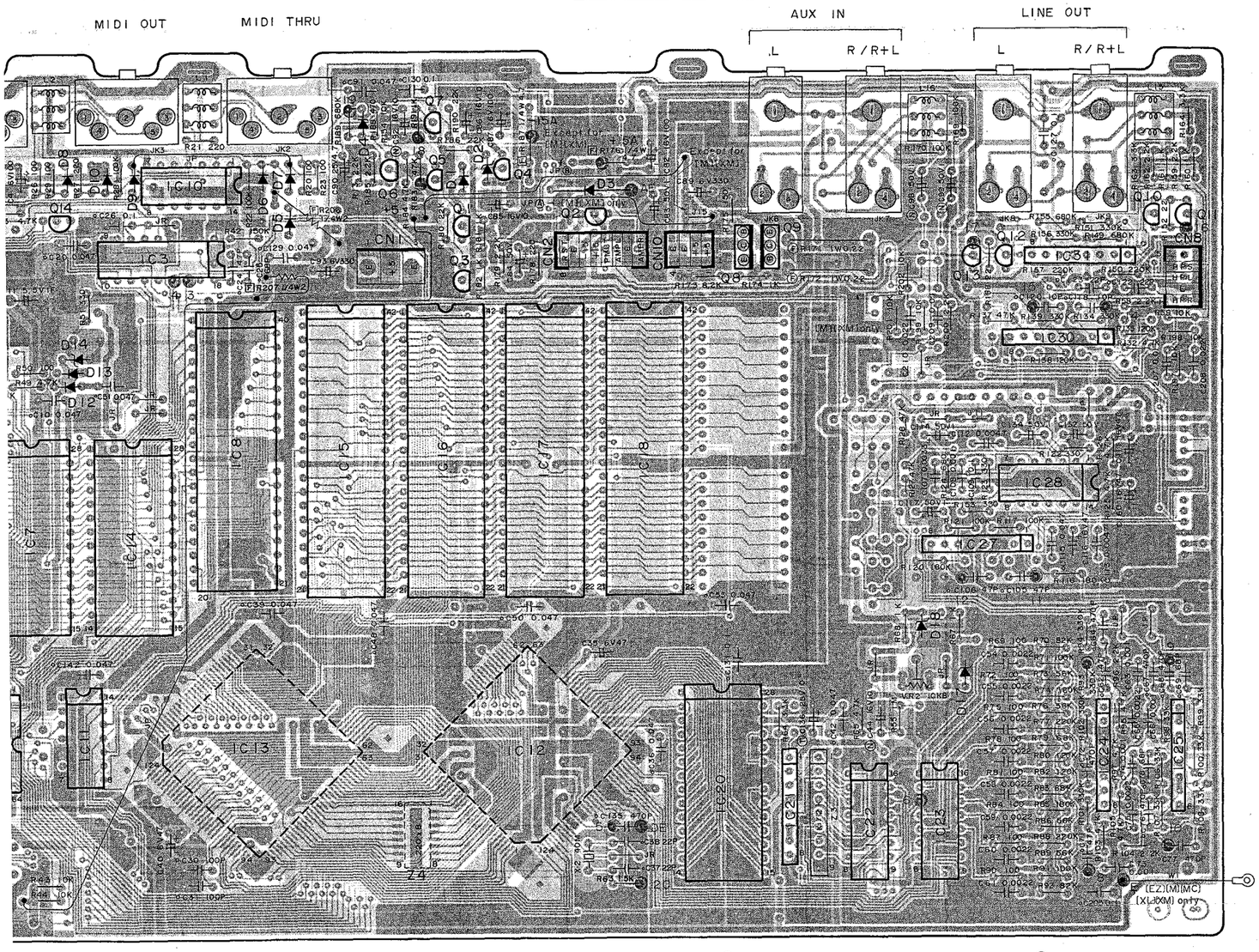
6 7 8 9 10 11 12 13 14

• [M] [XM] areas **SXPG204381**

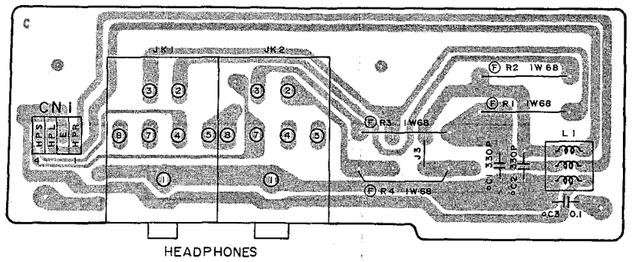
• [EZ] [MC] [XL] areas **SXPG2043171**

• Other areas **SXPG204341**

Circuit view on top of P.C.B.



HP HEADPHONES CIRCUIT BOARD SXPG203731B



MAIN

NOTES:

- IC'S

IC1:	SVIGD70320GJ
IC2:	SVIGMB621407
IC3:	SVIGMSM6253
IC4:	QSIGAR35AX0
IC5:	QSIGBR35AX0
IC7:	SVIGM5256BLL
IC8:	QSIGH3C04C44
IC9:	SVIGTLP513
IC10:	SVIGM74LS07
IC11:	SVIGTC40H004
IC12:	MN73012PGC
IC13:	MN73013PGD
IC14:	SVIGHM65256
IC15:	QSIGH3C08C26
IC16:	QSIGH3C08C45
IC17:	QSIGU3C04137
IC18:	QSIGU3C08026
IC20:	SVIGPCM54
IC21:	SVIGM5238L
IC22, 23:	SVIGT74H4051
IC24, 25, 27, 30, 31:	SVIGM5218L
IC28:	SVIGLM1894N
IC33, 35:	SVIGTC40H032
IC34:	SVIGTC40H000

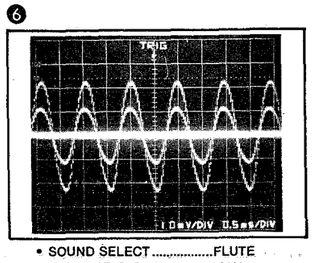
- TRANSISTORS

Q1, 2, 6:	2SC2320LFG
Q3~5, 7, 14:	2SA1015-GR
Q8, 9: M XM	2SA1643
Q10, 12:	2SC3940ARS
Q11, 13:	2SA1534ARS
Q15:	2SC1047C

- DIODES

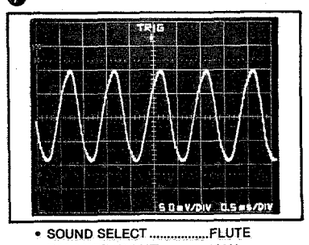
D1, 4~13:	MA165TA5
D2:	MA4062
D3:	EK04
D14:	MA4056
D17, 18:	MA4051MTA

⑥



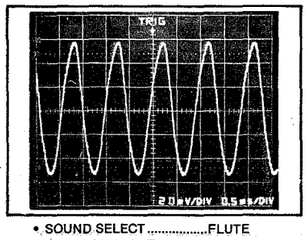
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT) .....MAX
- MAIN VOLUME .....MAX
- Keyboard .....C_{52} Key

⑦



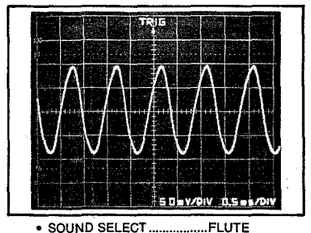
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT) .....MAX
- MAIN VOLUME .....MAX
- Keyboard .....C_{52} Key

⑧



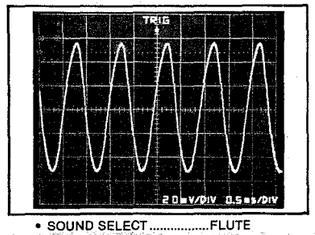
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT) .....MAX
- MAIN VOLUME .....MAX
- Keyboard .....C_{52} Key

⑨



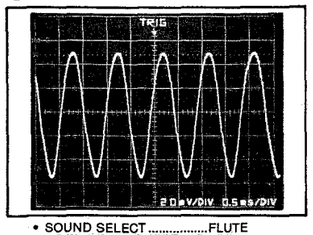
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT) .....MAX
- MAIN VOLUME .....MAX
- Keyboard .....C_{52} Key

⑩



- SOUND SELECT .....FLUTE
- BALANCE (RIGHT) .....MAX
- MAIN VOLUME .....MAX
- Keyboard .....C_{52} Key

⑪



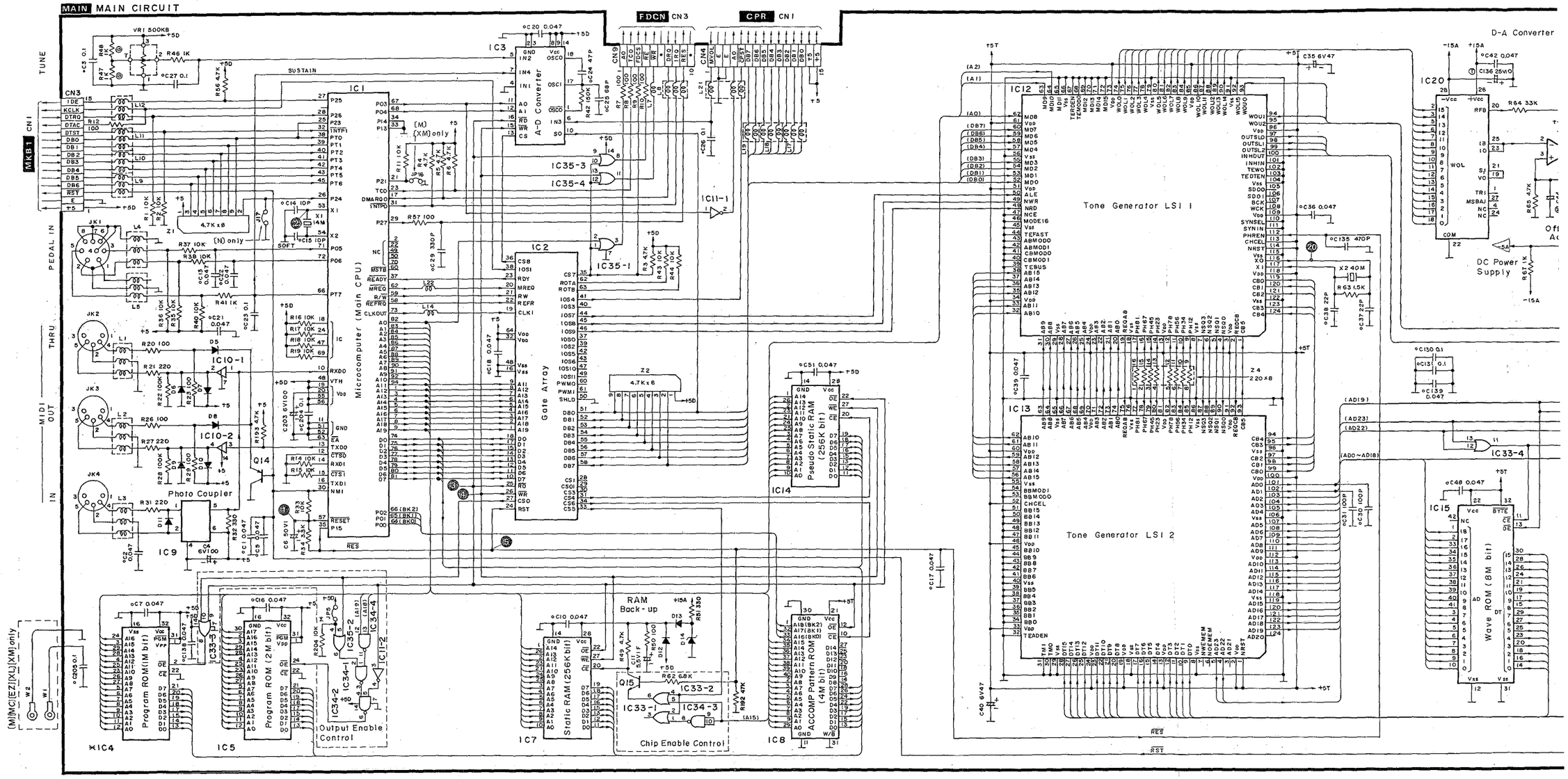
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT) .....MAX
- MAIN VOLUME .....MAX
- Keyboard .....C_{52} Key

MAIN HP

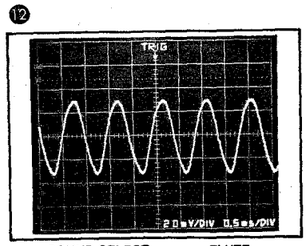
MAIN AND HEADPHONES CIRCUIT DIAGRAM

1 2 3 4 5 6 7 8 9 10

A B C D E F

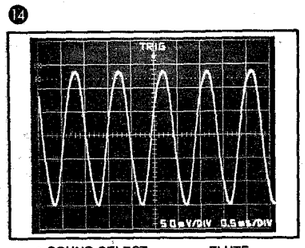


⑫



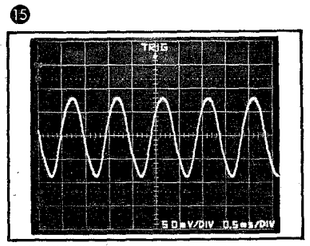
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

⑭



- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

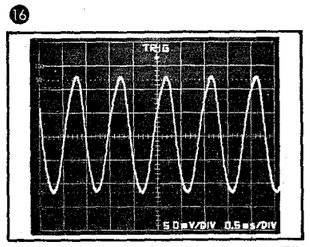
⑮



- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

II-9

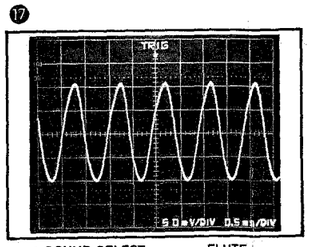
⑯



- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

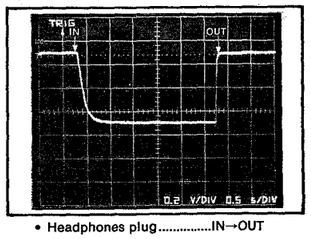
II-10

⑰



- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

⑱ PMUT



- Headphones plug.....IN→OUT

⑲ RS

- POW

D-A Converter

Level Shifter

Panning Circuit

Notch Filter

Low-Pass Filter

Rch Mixing

Lch Mixing

Headphones Amplifier

Noise Reduction

Offset Adj.

DC Power Supply

DC Power Supply

Wave ROM (8M bit)

Wave ROM (8M bit)

Wave ROM (4M bit)

Wave ROM (8M bit)

Muting Control Circuit

FD DC Power Supply

Except for (M)(XM)

(M)(XM) only

⑲ $\overline{RST}$

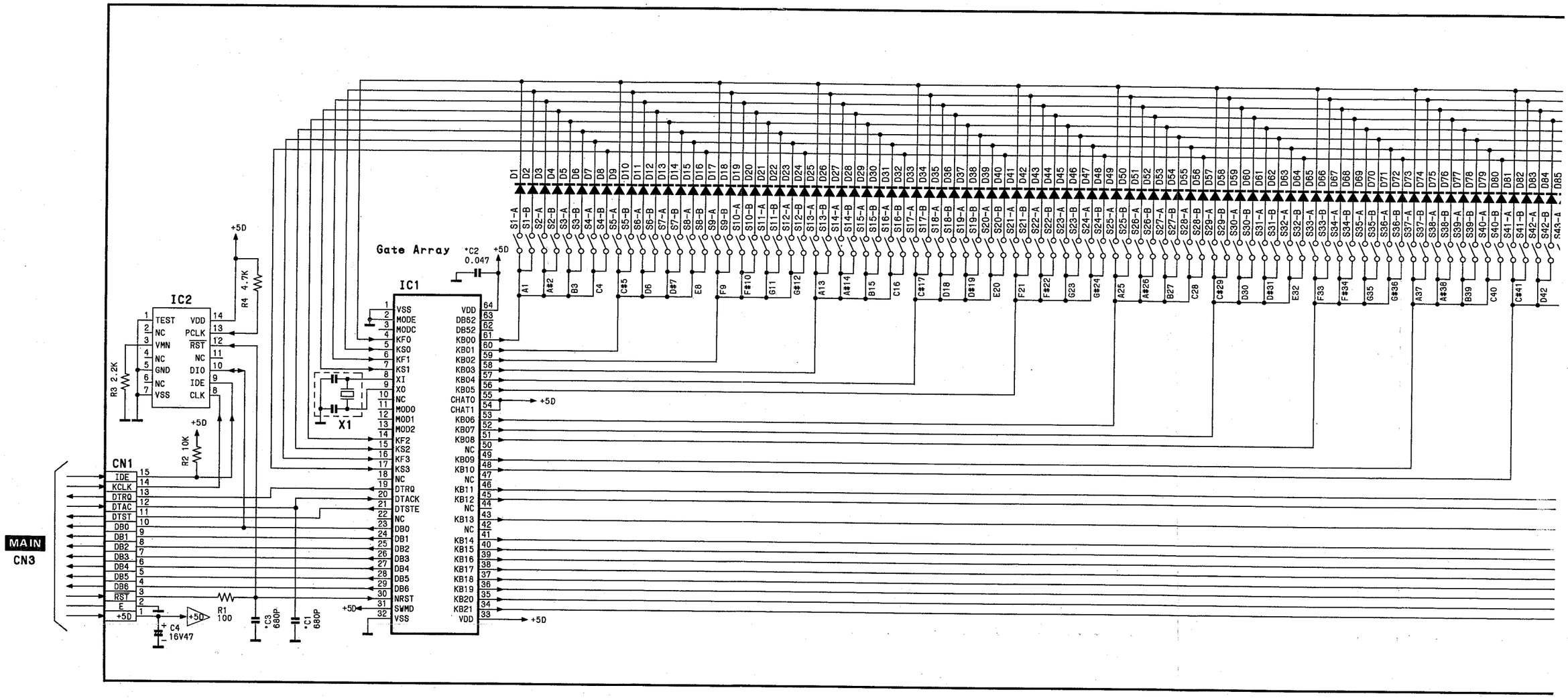
⑳ X2, 40MHz

• POWER.....ON→OFF

HP HEADPHONES CIRCUIT

MANUAL KEYBOARD 1, 2 CIRCUIT DIAGRAM

MKB1 MANUAL KEYBOARD 1 CIRCUIT DIAGRAM

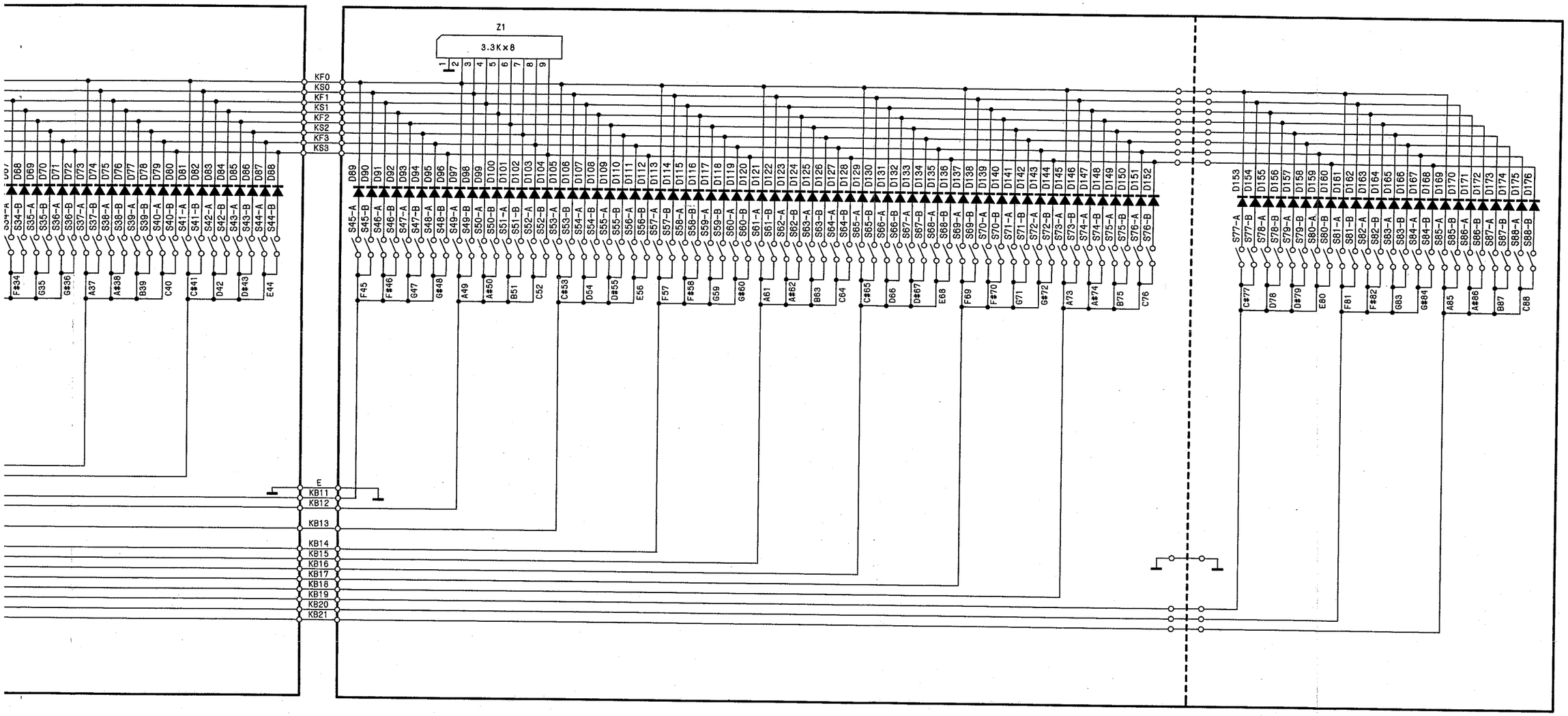


MKB1

NOTES:

- IC'S
  - IC1: MN50020PGV
  - IC2: MN1231
- DIODES
  - D1~88: MA162A

MKB2 MANUAL KEYBOARD 2 CIRCUIT DIAGRAM



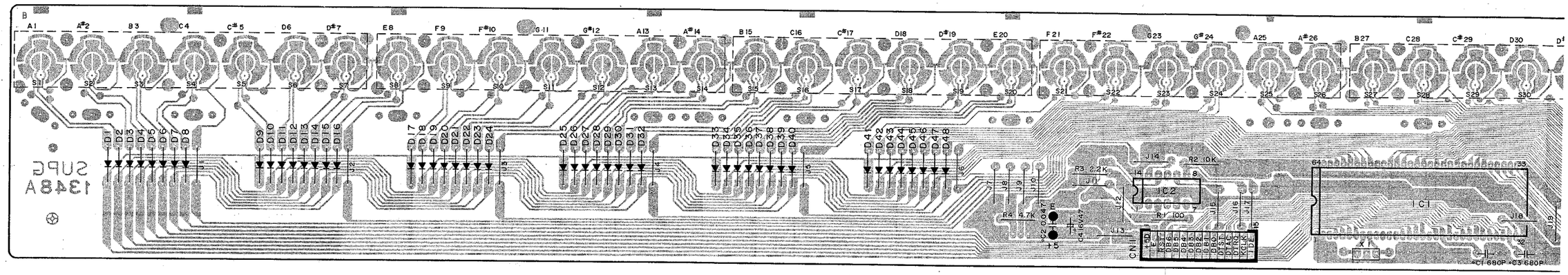
MKB2

NOTES:

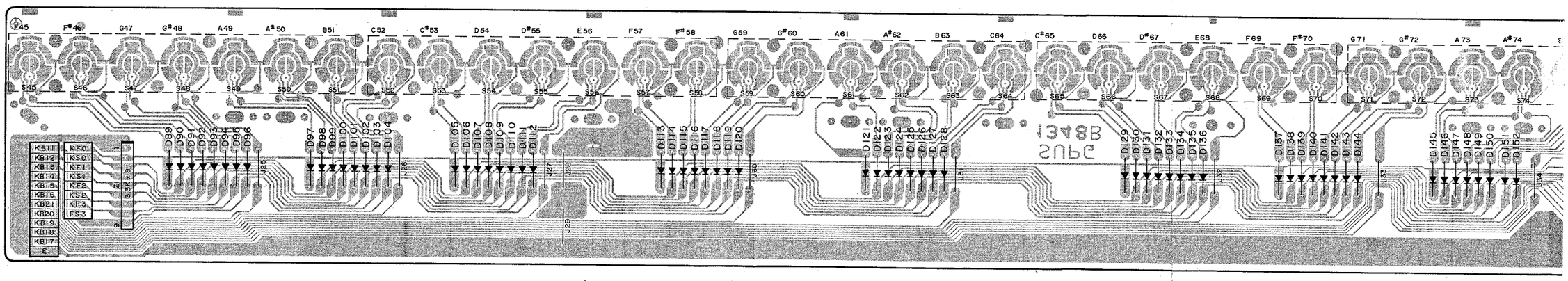
- DIODES
  D89～176: MA162A

MKB1 MKB2 MANUAL KEYBOARD 1,2 CIRCUIT BOARD

MKB1 MANUAL KEYBOARD 1 CIRCUIT BOARD



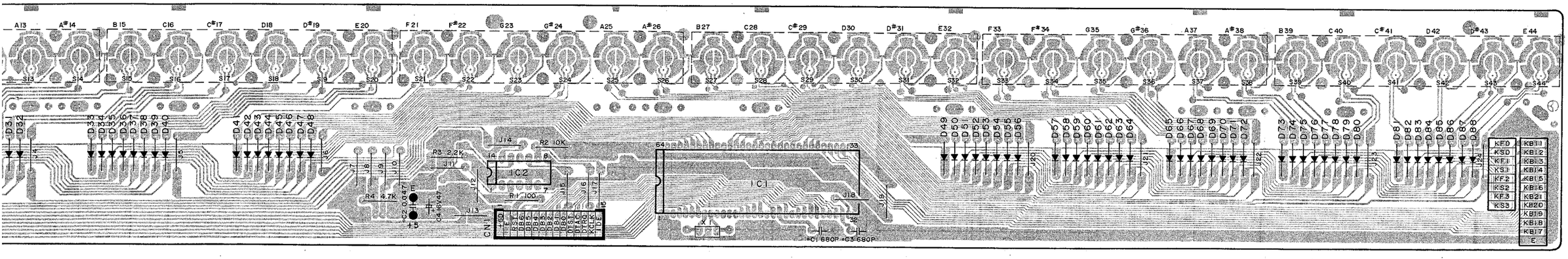
MKB2 MANUAL KEYBOARD 2 CIRCUIT BOARD



IRCUIT BOARD

5 6 7 8 9 10 11 12 13 14

SXPG134841A

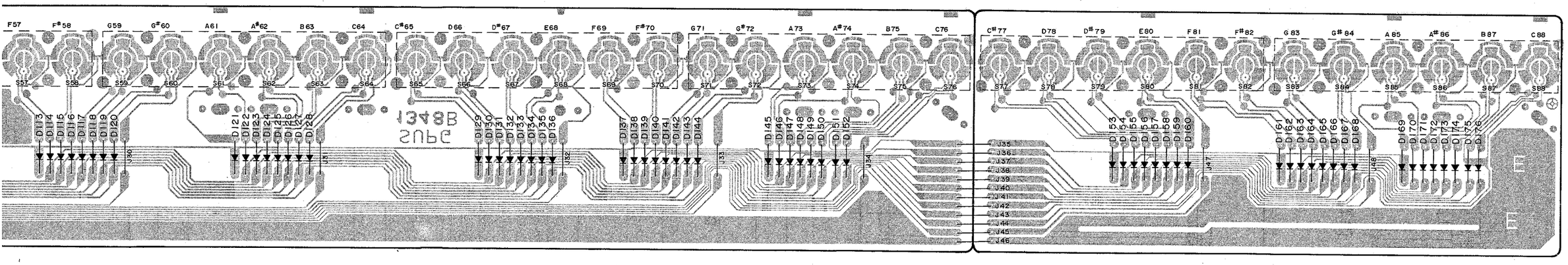


MKB1

NOTES:

- IC'S
  - IC1: MN50020PGV
  - IC2: MN1231
- DIODES
  - D1~88: MA162A

SXPG134841B



MKB2

NOTES:

- DIODES
  - D89~176: MA162A

CPR FDCN CONTROL PANEL RIGHT AND FD CONNECTOR CIRCUIT DIAGRAM

CPR

SOUND SELECT

PANEL MEMORY

MUSICAL DISPLAY

TEMPO

TRANSPOSE /PROGRAM

GRAND PIANO
UPRIGHT PIANO
E PIANO 1
E PIANO 2
DIGITAL CELESTE 1
DIGITAL CELESTE 2
SUSTAIN PEDAL
(SPRIT POINT 3)
E.GRAND
HARPSI-CHORD
MALLET
GUITAR
FLUTE
SAX
BRASS
TRUMPET
ORGAN
STRINGS
ACOUSTIC BASS
ELECTRIC BASS
LEFT SELECT
SOUND VARIATION
SET
JAZZ WALTZ
LATIN 1
LATIN 2
BOSSANOVA
START/STOP
(SPLIT POINT 1)
(SPLIT POINT 2)
SLOW
FAST
DOWN
UP
BEAT 1
BEAT 2
BEAT 3
BEAT 4

IC1
Gate Array
IC2
IC3
IC4

DC POWER SUPPLY

CN1 MAIN
CN4
CN3
CN1 CPL

II-20
II-21
II-22

CONNECTOR CIRCUIT DIAGRAM

5 6 7 8 9 10 11 12 13 14

SOUND SELECT

PANEL MEMORY

MUSICAL DISPLAY

RHYTHM SELECT

E.GRAND D16 S16 D66
BRASS D22 S22 D72
HARPSI-CHORD D17 S17 D67
TRUMPET D23 S23 D73
MALLET D18 S18 D68
ORGAN D24 S24 D74
GUITAR D19 S19 D69
STRINGS D25 S25 D75
FLUTE D20 S20 D70
ACOUSTIC BASS D26 S26 D76
SAX D21 S21 D71
ELECTRIC BASS D27 S27 D77

SET D31 S31 D34 S34
1 D81
2 D82
3 D83

LDI-a1 LDI-b1 LDI-c1 LDI-d1
LDI-a2 LDI-b2 LDI-c2 LDI-d2
LDI-a3 LDI-b3 LDI-c3 LDI-d3
LDI-e1 LDI-f1 LDI-g1 LDI-h1
LDI-e2 LDI-f2 LDI-g2 LDI-h2
LDI-e3 LDI-f3 LDI-g3 LDI-h3

TEMPO
SLOW D35 S35
FAST D37 S37

BEAT 1 D84
BEAT 2 D85
BEAT 3 D86
BEAT 4 D88

TRANSPOSE/PROGRAM
DOWN D36 S36 D87
UP D38 S38 D89

JAZZ WALTZ D39 S39 D90
LATIN 1 D40 S40 D91
LATIN 2 D41 S41 D92
BOSSANOVA D42 S42 D93
START/STOP D43 S43 D94
(SPLIT POINT 1) D96
(SPLIT POINT 2) D97

JAZZ ROCK D98
SWING ROCK D99
DISCO D100
LATIN ROCK D101
RHYTHM VARIATION D45 S45 D102
COMPOSER D47 S47 D104
KEYBOARD PERCUSSION D48 S48 D105

R21 47 R22 47 R23 47 R24 47 R25 47 R26 47 R27 47 R28 47 R29 47 R30 47 R31 47 R32 47 R33 47 R34 47 R35 47 R36 47 R37 47 R38 47 R39 47

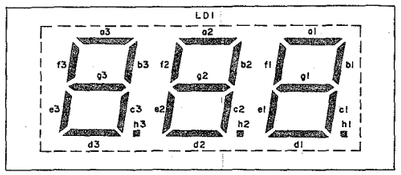
IC2 IC3 IC4 IC5

+5 0.1 C7 C8

II-21

MUSICAL DISPLAY

LD1



FDCN

MAIN CN10

CN1 +5 +5 E E
L1
0.1 C1
ZC1 47P x 8
CN4 E +5 +5 DB0 DB1 DB2 DB3 DB4 DB5 DB6 DB7

+5 CN2 DB0 DB1 DB2 DB3 DB4 DB5 DB6 DB7
L2
ZC2 47P x 8

CN3 A0 TCO FDCS RE WR DRQ IRQ RES
L3
A0 TCO FDCS RE WR DACK DRQ IRQ RES MODE E

MAIN CN9

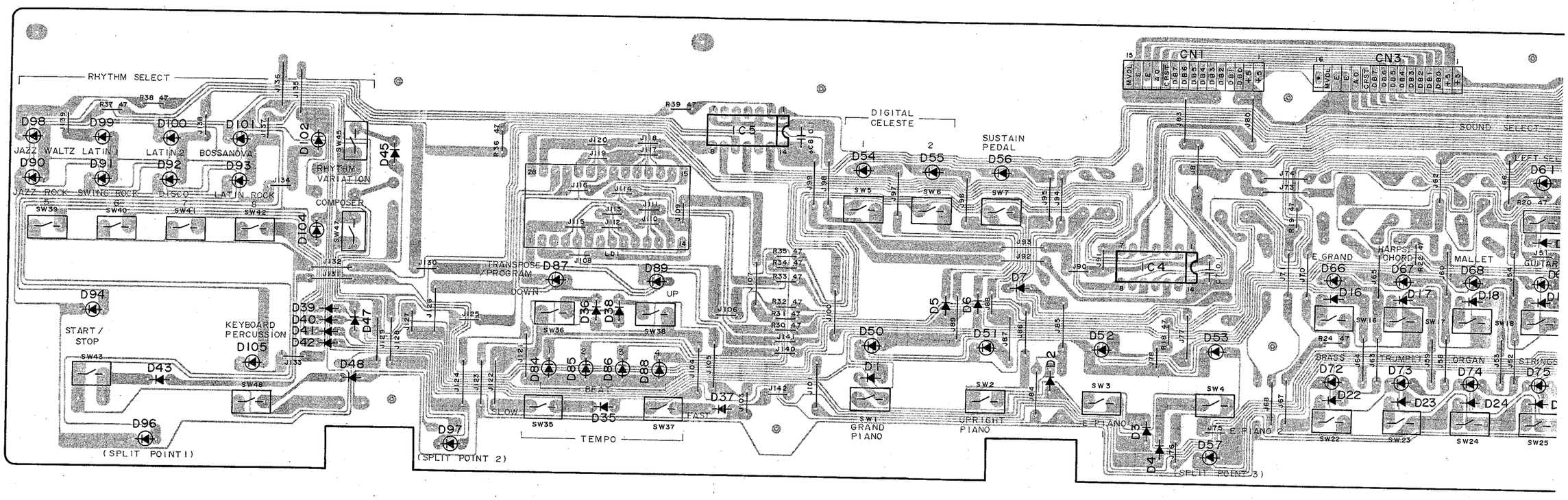
DIGITAL DISK RECORDER [OPTION]

SY-FD20

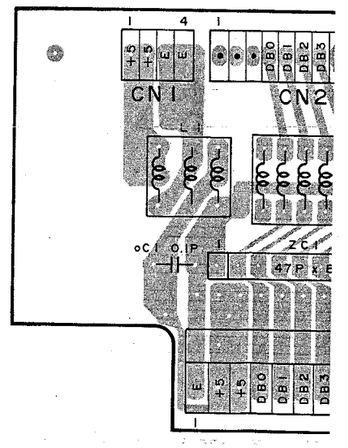
II-22

CPR FDCN CONTROL PANEL RIGHT AND FD CONNECTOR CIRCUIT BOARD

CPR



FDCN



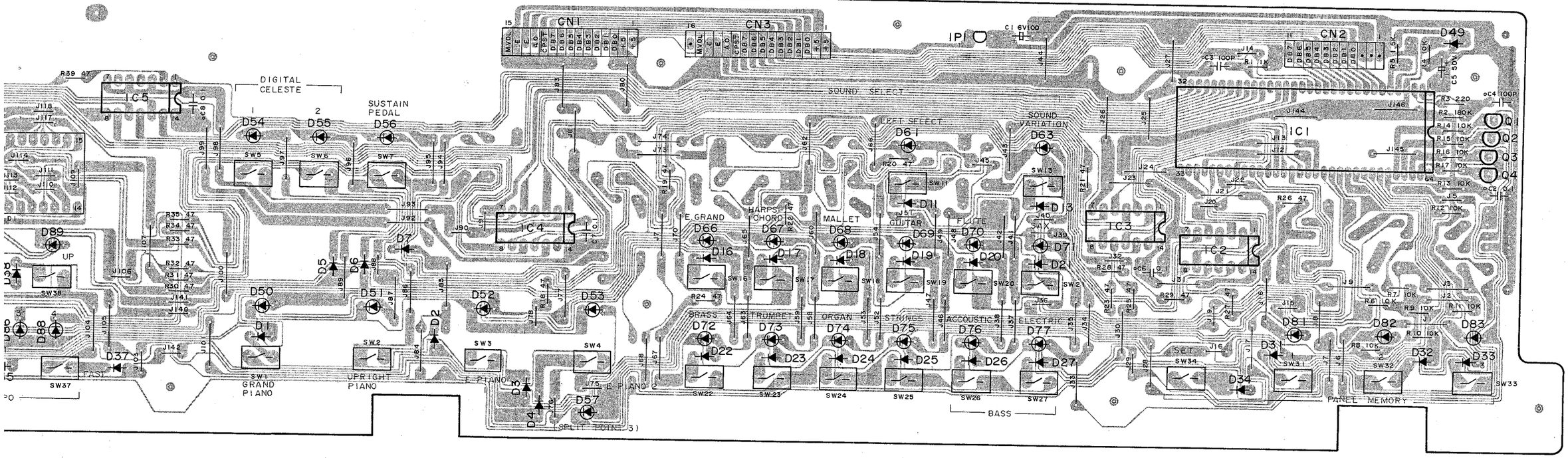
CPR

NOTES:

- IC'S
  - IC1: SVIGM603A121
  - IC2~5: SVIGM74LS07
- TRANSISTORS
  - Q1~4: 2SA830SB
- DIODES
  - D1~43, 45, 47~49: MA165TA5
  - D50~77, 84, 87, 89~94, 96~102, 105: LN282R
  - D78~83, 85, 86, 88, 104: LN382G

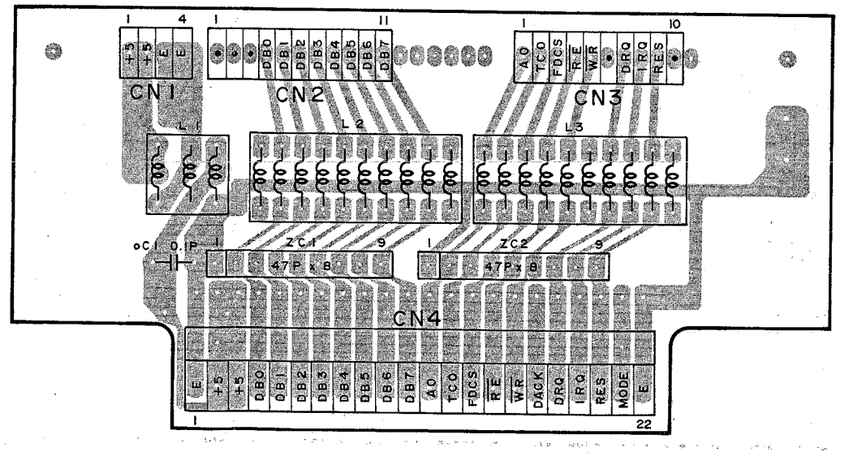
FD CONNECTOR CIRCUIT BOARD

SXPG204521B

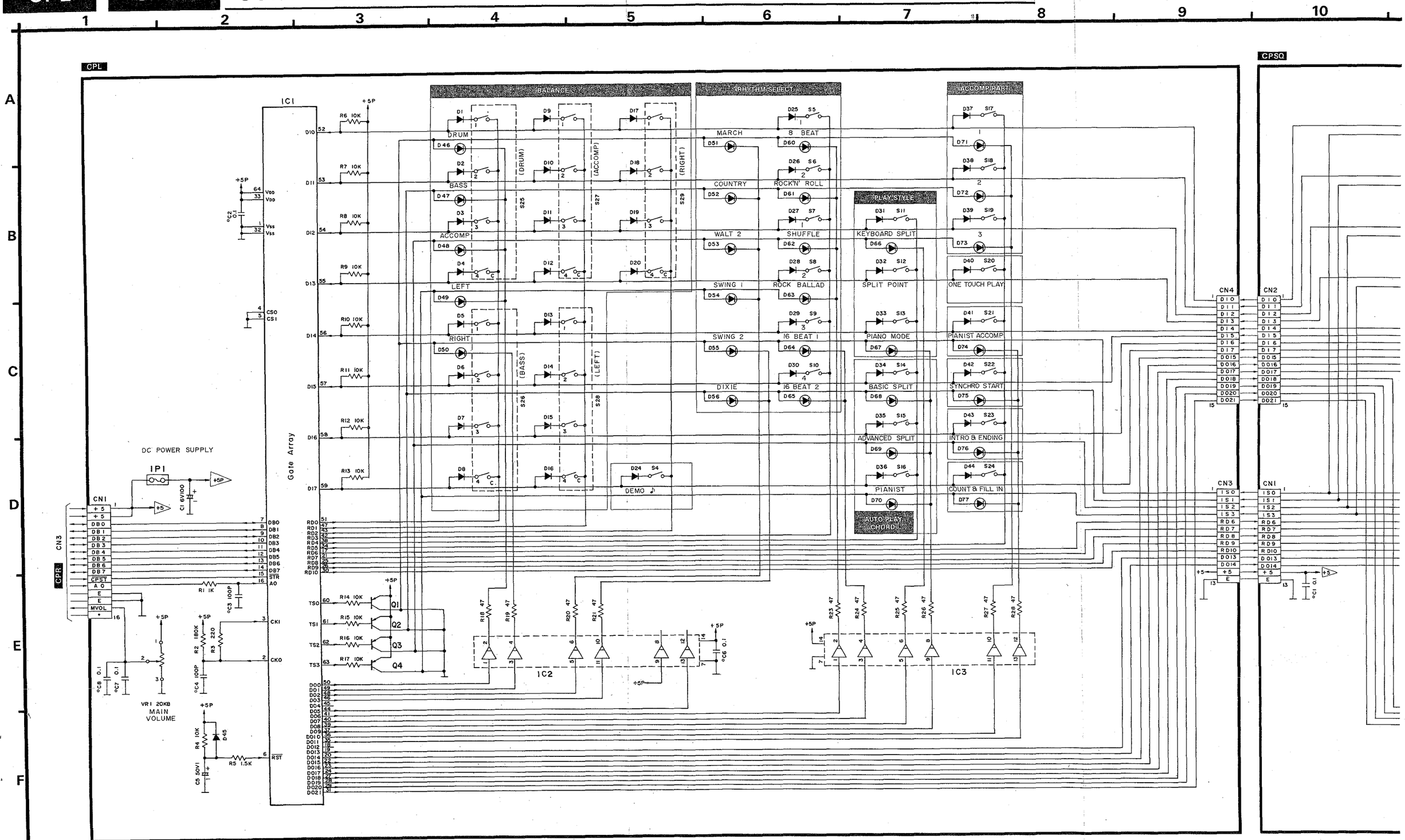


FDCN

SXPG204911B



CPL CPSQ CONTROL PANEL LEFT AND SEQUENCER CONTROL CIRCUIT DIAGRAM



ENCER CONTROL CIRCUIT DIAGRAM

5 6 7 8 9 10 11 12 13 14

CPSQ

RHYTHM SELECT

ACCOMP PART

PLAY STYLE

PROGRAM SECTION

SOUND

CONTROL 1

CONTROL 2

MIDI

AUTO PLAY CHORD

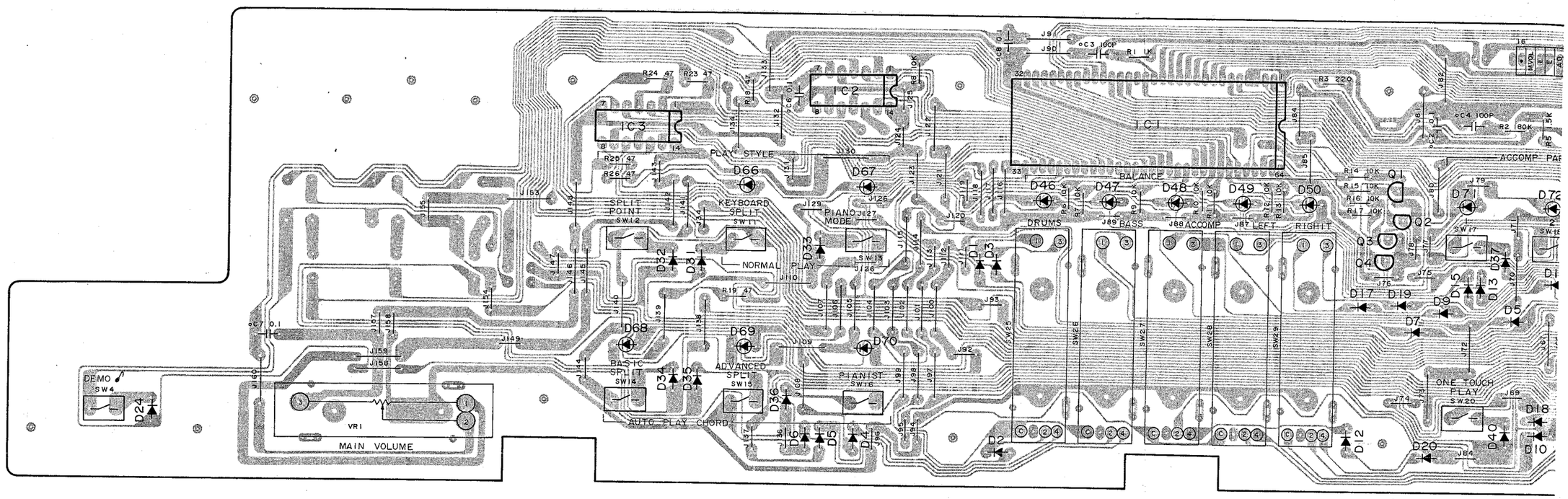
MARCH
8 BEAT
COUNTRY
ROCK'N' ROLL
WALT 2
SHUFFLE
SWING 1
ROCK BALLAD
SWING 2
16 BEAT 1
DIXIE
16 BEAT 2
DEMO
KEYBOARD SPLIT
SPLIT POINT
PIANO MODE
BASIC SPLIT
ADVANCED SPLIT
PIANIST
ONE TOUCH PLAY
PIANIST ACCOMP
SYNCHRO START
INTRO & ENDING
COUNT & FILL IN
RIGHT
LEFT
BASS
ACCOMP1/CHORD
ACCOMP 2
ACCOMP 3
DRUMS
CONTROL
P.MEM P-CHANGE
OTHERS
LOAD
SAVE
OCTAVE SHIFT
REVERB DEPTH
ACCOMP VOLUME
PIANO TUNING
TOUCH SENSITIVITY
CHANNEL
OCTAVE SHIFT
LOCAL CONTROL
PEDAL SETTING
P.MEM EXPAND
MIN RANGE
MEDLEY
DISK FORMAT
EXCUTE
COMPOSER CLEAR
TRACK CLEAR
SONG CLEAR
INTIAL
QUANTIZE
BEAT
SEQUENCER REC
STEP CHORD REC
COMPOSER REC

CN4 CN2 CN3 CN1

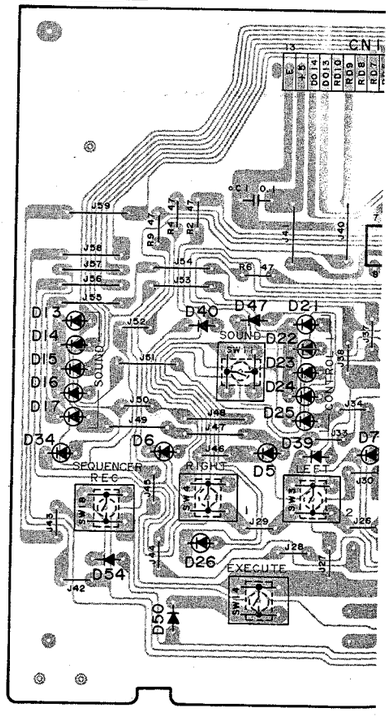
IC1-1 IC1-2 IC2-1 IC2-2 IC3

CPL CPSQ CONTROL PANEL LEFT AND SEQUENCER CONTROL CIRCUIT BOARD

CPL



CPSQ



CPL

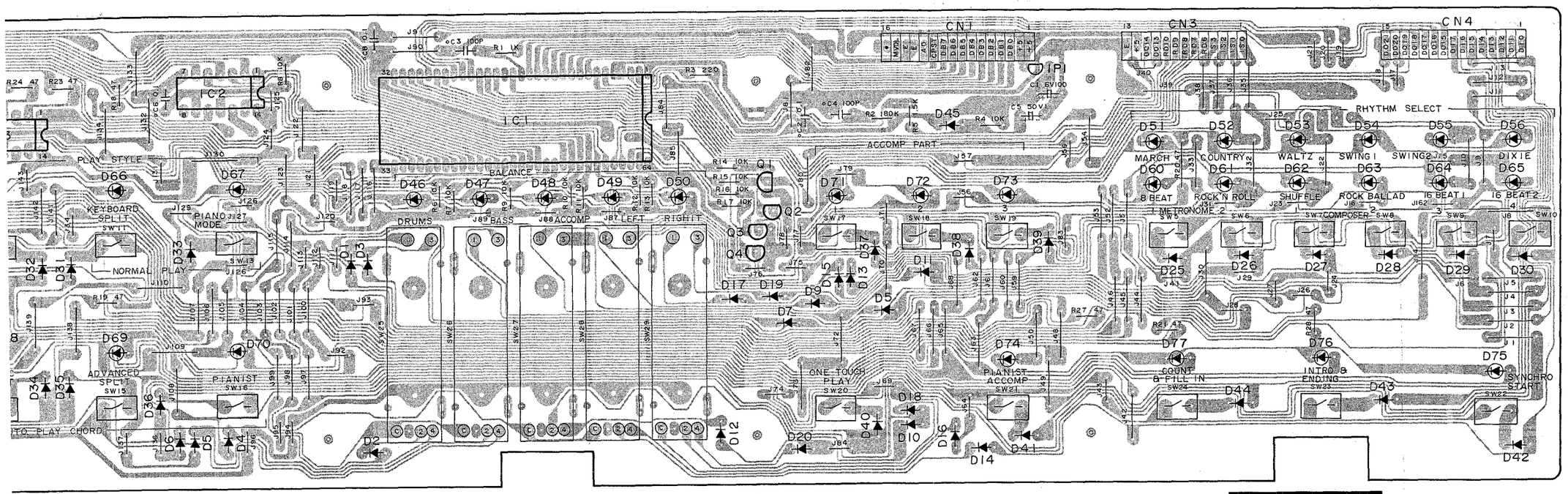
NOTES:

- IC'S
  - IC1: SVIGM603A121
  - IC2, 3: SVIGM74LS07
- TRANSISTORS
  - Q1~4: 2SA830SB
- DIODES
  - D1~45: MA165TA5
  - D46~77: LN282R

QUENCER CONTROL CIRCUIT BOARD

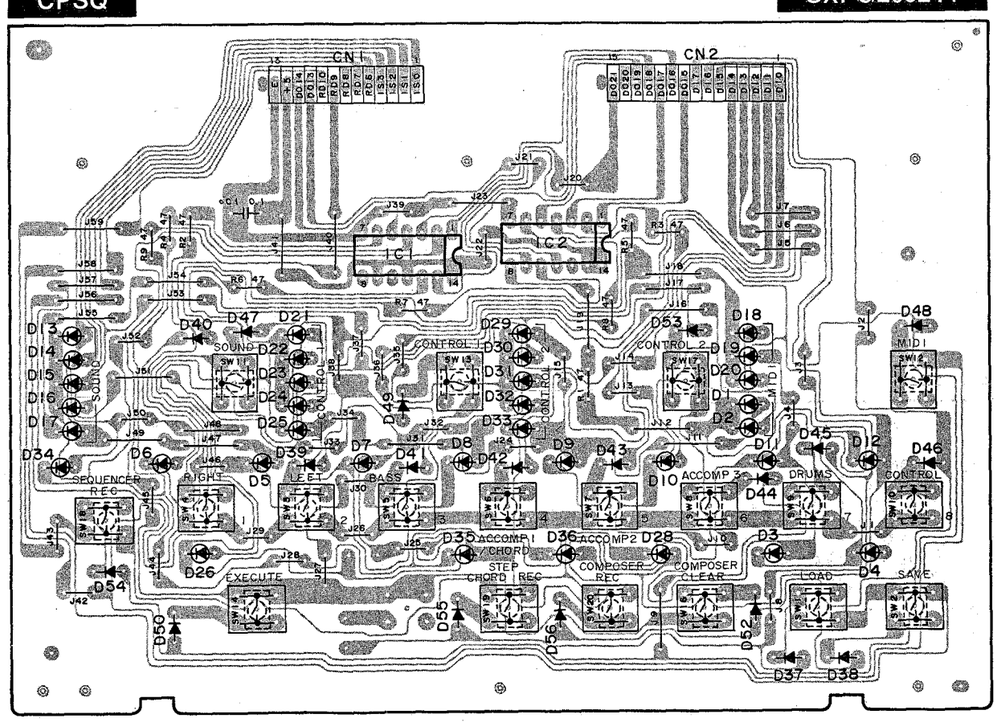
5 6 7 8 9 10 11 12 13 14

SXPG204521A



CPSQ

SXPG205211



CPSQ

NOTES:

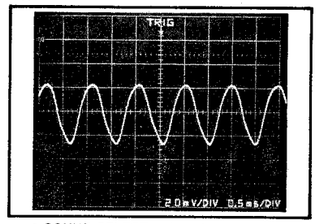
- IC'S
  - IC1, 2: SVIGM74LS07
- DIODES
  - D1, 2, 13~25, 29~33: LN282R
  - D3~12, 26, 28, 34~36: LN382G
  - D37~50, 52~56: MA165TA5

AMP & POWER SUPPLY, AC POWER SUPPLY AND PEAK CANCELLER CIRCUIT DIAGRAM

■ Waveform measurement

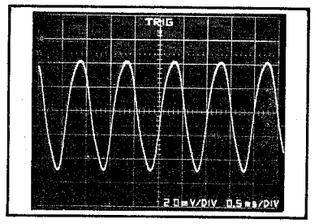
1. Activate the initial setting method. (Refer to page I-15)
2. Set the touch sensitivity level to the "0". (Refer to page I-15)
3. Set the D. Piano to required mode following each check point(s).

❶



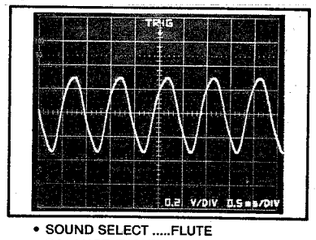
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

❷



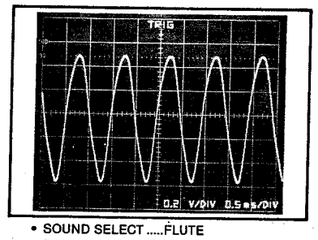
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

❸



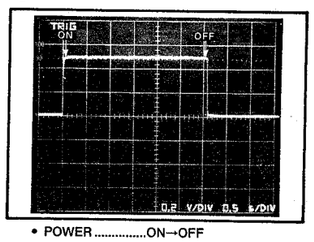
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

❹



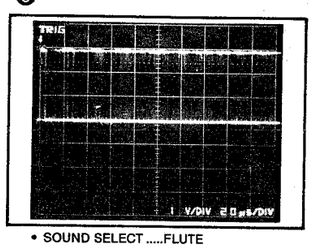
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

❺ RST



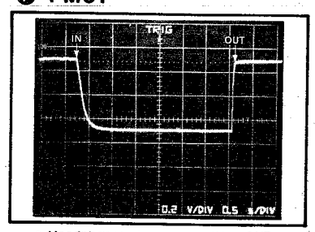
- POWER .....ON→OFF

❻

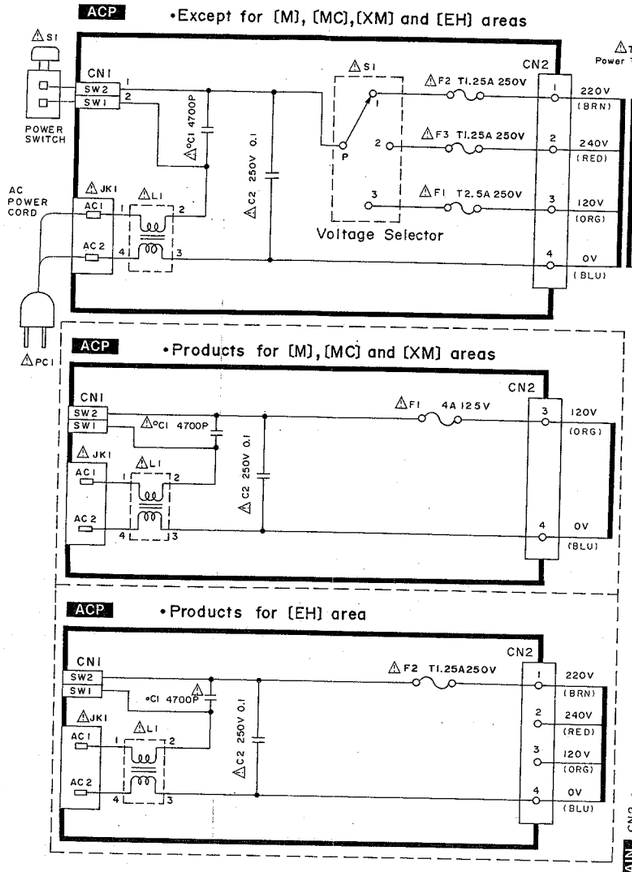


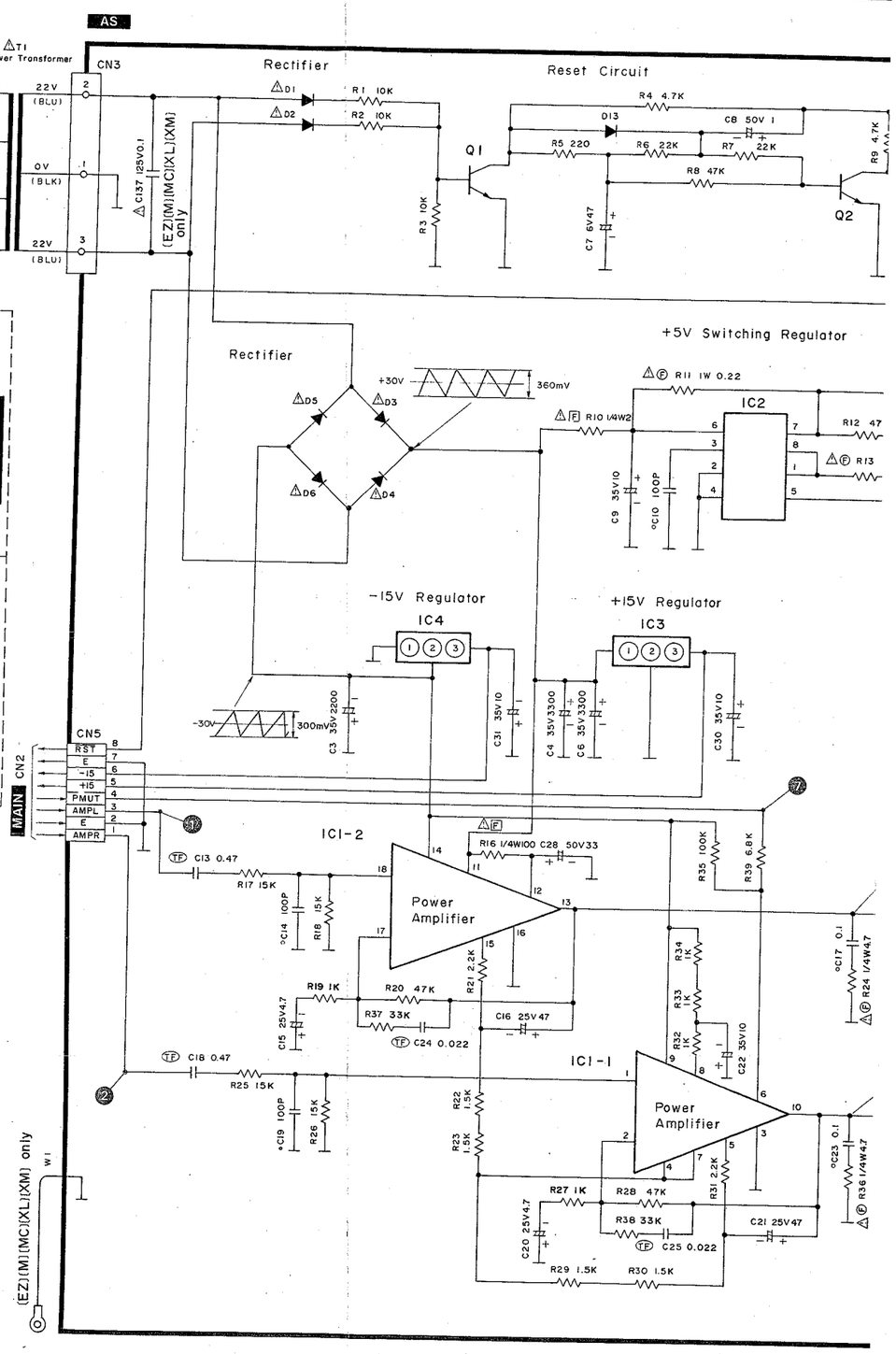
- SOUND SELECT .....FLUTE
- BALANCE (RIGHT).....MAX
- MAIN VOLUME.....MAX
- Keyboard .....C_{52} Key

❼ PMUT



- Headphones plug.....IN → OUT





ACP

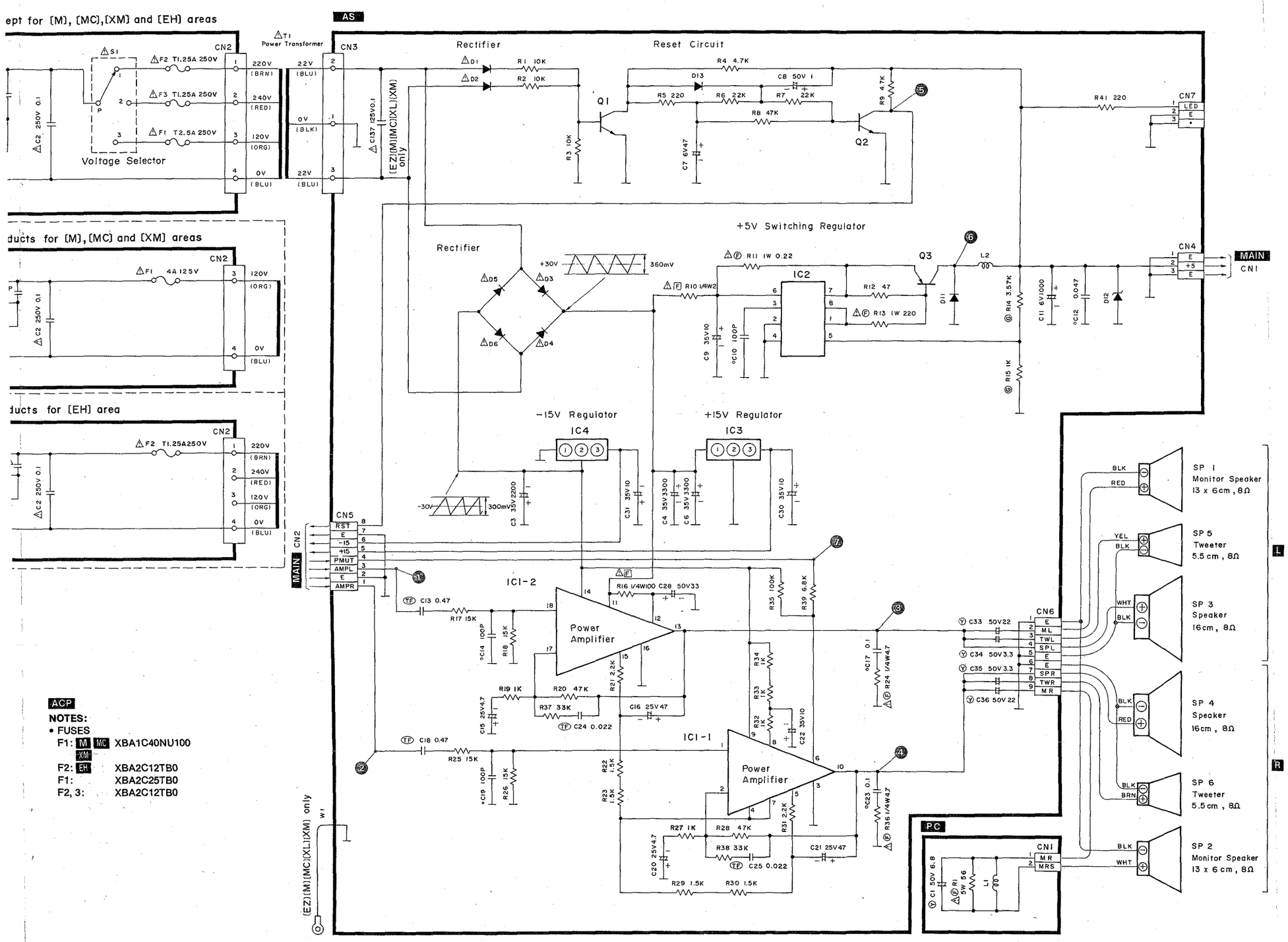
NOTES:

- FUSES

F1:	M MC XM	XBA1C40NU100
F2:	EH	XBA2C12TB0
F1:		XBA2C25TB0
F2, 3:		XBA2C12TB0

POWER SUPPLY AND PEAK CANCELLER CIRCUIT DIAGRAM

5 6 7 8 9 10 11 12 13 14



ACP

NOTES:

- FUSES

F1:	M MC XM	XBA1C40NU100
F2:	EH	XBA2C12TB0
F1:		XBA2C25TB0
F2, 3:		XBA2C12TB0

AS

NOTES:

- IC'S

IC1:	SVIGS4172M2M
IC2:	SVIGM5291P
IC3:	SVIGM5F7815
IC4:	SVIGM5F7915

- TRANSISTORS

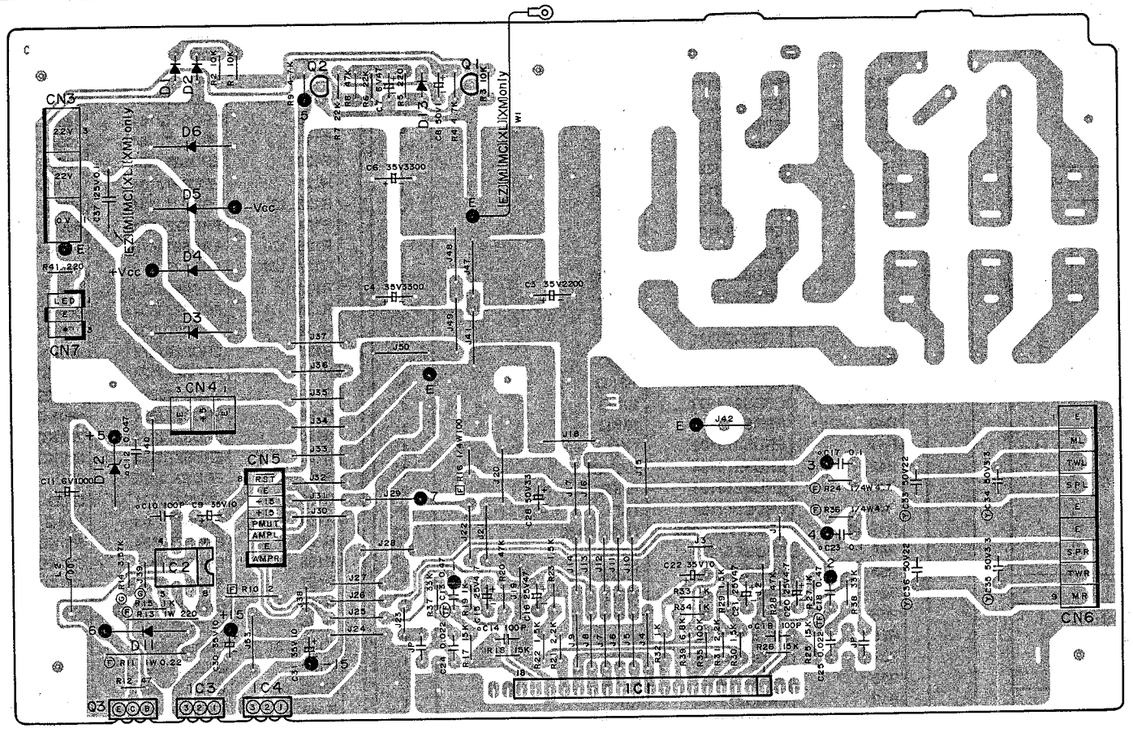
Q1, 2:	2SC2320LFG
Q3:	2SB953AQP

- DIODES

D1, 2:	SVDGERA1502Y
D3~6:	SVDGS3V20-15
D11:	SVDGRK14S
D12:	MA2062LF
D13:	MA165TA5

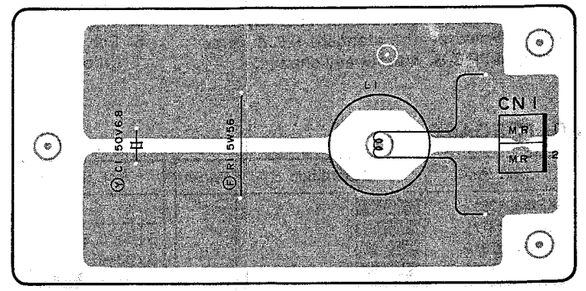
AS ACP PC AMP & POWER SUPPLY, AC POWER SUPPLY AND PEAK CANCELLER CIRCUIT BOARD

AS • [EZ] [M] [MC] [XL] [XM] areas **SXPG2037171A** • Other areas **SXPG2037151A**



• Except for [M] [MC] [XM] [EH] [XL] [XR] areas **SXPG204971A**

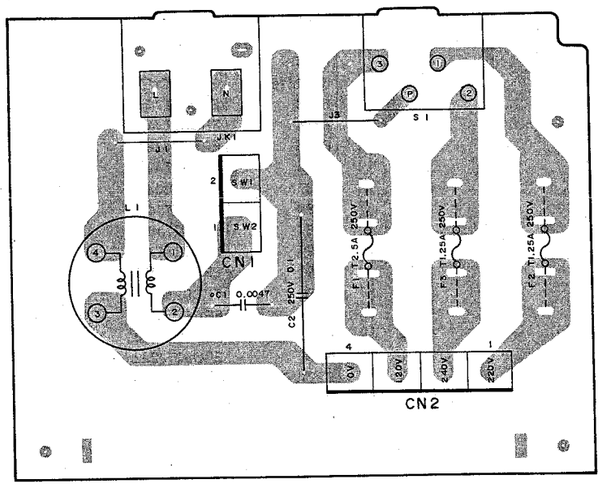
PC **SXPG204721**



AS

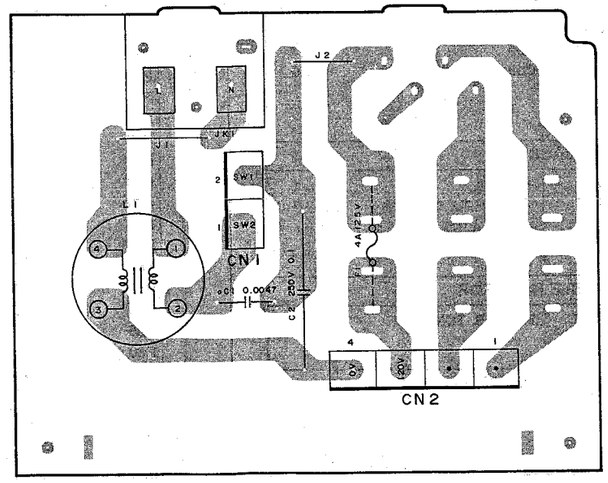
NOTES:
- IC'S
  - IC1: SVIGS4172M2M
  - IC2: SVIGM5291P
  - IC3: SVIGM5F7815
  - IC4: SVIGM5F7915
- TRANSISTORS
  - Q1, 2: 2SC2320LFG
  - Q3: 2SB953AQP
- DIODES
  - D1, 2: SVDGERA1502Y
  - D3~6: SVDGS3V20-15
  - D11: SVDGRK14S
  - D12: MA2062LF
  - D13: MA165TA5

ACP • [XL] [XR] areas **SXPG2049101A**



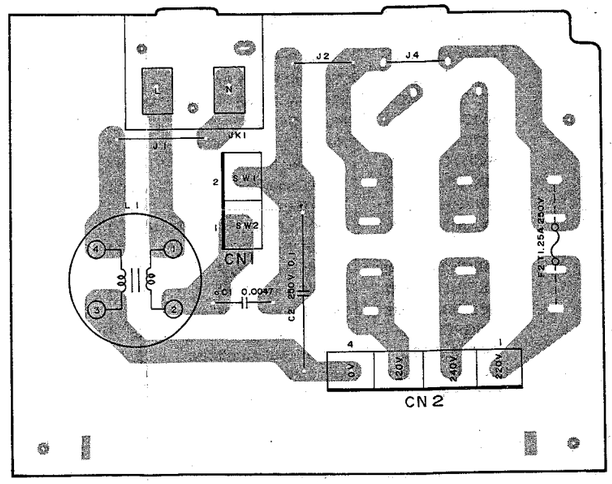
NOTES:
- FUSES
  - F1: XBA2C25TB0
  - F2: XBA2C12TB0

ACP • [M] [MC] [XM] areas **SXPG204991A**



NOTE:
- FUSE
  - F1: XBA1C40NU100

ACP • [EH] areas **SXPG2049111A**



NOTE:
- FUSE
  - F2: XBA2C12TB0

REPLACEMENT PARTS LIST.....P.C.B. and Wiring Parts

Notes:

1. Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.
2. The "S" mark is for a service standard part.
3. The P.C.B. part number is service standard part and may differ from production part. However, the standard P.C.B. is exchangeable to the original P.C.B. without any change.
4. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
5. ○ mark are new parts.
6. For part No. with area mark, check the area when placing an order.

■ PRINTED CIRCUIT BOARD

	NLA	Area	Part No.	Description	Per/Set
○	NLA	M XM	SXPG204381	MAIN	1
Ⓢ	NLA	Others	SXPG2043171	MAIN	1
○	NLA		SXPG203731B	HP	1
	NLA		SXPG134841A	MKB1	1
	NLA		SXPG134841B	MKB2	1
○	NLA		SXPG204521B	CPR	1
○	NLA		SXPG204911B	FDCN	1
○	NLA		SXPG204521A	CPL	1
○	NLA		SXPG205211	CPSQ	1
○	NLA	M MC XM	SXPG204991A	ACP	1
○	NLA	XL XR	SXPG2049101A	ACP	1
○	NLA	EH	SXPG2049111A	ACP	1
○	NLA	Others	SXPG204971A	ACP	1
Ⓢ	NLA		SXPG2037171A	AS	1
○	NLA		SXPG204721	PC	1

MAIN MAIN CIRCUIT

Ref. No.	Part No.	Description	Per/Set
INTEGRATED CIRCUITS			
IC1	SVIGD70320GJ	16 bit Microcomputer	1
IC2	SVIGMB621407	Gate Array	1
IC3	SVIGMSM6253	A/D Converter	1
○ IC4	QSIGAR35AX0	1M bit Programmed EP ROM	1
○ IC5	QSIGBR35AX0	2M bit Programmed EP ROM	1
IC7	SVIGM5256BLL	256K bit Static RAM	1
○ IC8	QSIGH3C04C44	4M bit ACCOMP Pattern ROM	1
IC9	SVIGTLP513	Photo Coupler	1
IC10	SVIGM74LS07	Hex Buffers (O.C.)	1
IC11	SVIGTC40H004	Hex Inverters	1
○ IC12	MN73012PGC	Tone Generator LSI 1	1
○ IC13	MN73013PGD	Tone Generator LSI 2	1
IC14	SVIGHM65256	256K bit Pseudo Static RAM	1
○ IC15	QSIGH3C08C26	8M bit Wave ROM	1
○ IC16	QSIGH3C08C45	8M bit Wave ROM	1
○ IC17	QSIGU3C04137	4M bit Wave ROM	1
○ IC18	QSIGU3C08026	8M bit Wave ROM	1
IC20	SVIGPCM54	D-A Converter	1
IC21	SVIGM5238L	Operational Amplifier	1
IC22, 23	SVIGT74H4051	8-channel Multiplexer	2
IC24, 25, 27, 30, 31	SVIGM5218L	Operational Amplifier	5
IC28	SVIGLM1894N	Dynamic Noise Reduction	1
IC33, 35	SVIGTC40H032	Quad 2-input OR Gates	2
IC34	SVIGTC40H000	Quad 2-input NAND Gates	1

Ref. No.	Part No.	Description	Per/Set
TRANSISTORS			
S Q1, 2, 6	2SC2320LFG	2SC1310FG (SUB. Part)	3
S Q3~5, 7, 14	2SA1015-GR	2SA933STRS (SUB. Part)	5
○ Q8, 9 M XM	2SA1643		2
Q10, 12	2SC3940ARS		2
Q11, 13	2SA1534ARS		2
Q15	2SC1047C		1
DIODES			
D1, 4~13	MA165TA5		11
D2	MA4062	Zener, 6.2V	1
D3	EK04		1
D14	MA4056	Zener, 5.6V	1
D17, 18	MA4051MTA	Zener, 5.1V	2
OSCILLATOR			
○ X1	QSXG1A1400A	14MHz, Quartz Oscillator	1
○ X2	QSXG1B4000A	40MHz, Quartz Oscillator	1
COMPONENT COMBINATIONS			
Z1, 2	EXBPI8472JM	4.7KΩ×8	2
Z3	EXAMR14A1002	1KΩ/2KΩ, Ladder Network	1
○ Z4	EXBM16V221JA	220Ω×8	1
COILS			
L1~5, 15, 16	QLQGT1B600MA	Coil	21
L7, 14, 22	QLQGT1B600MA	Coil	3
L8~12, 17~19, 21	SLQG15W34DPQ	Coil	9
JACKS			
○ JK1	QJSG002AA	Pedal IN	1
JK2~4	SJSG1370A	MIDI (THRU, OUT, IN)	3
JK6~9	SJJG400A	AUX IN, LINE OUT	4
VARIABLE RESISTOR			
○ VR1	EVJ01PF25B55	500KΩ B, TUNE	1
SEMI-FIXED RESISTOR			
VR2	EVND4AA00B14	10KΩ B, Offset Adj.	1
WIRES			
W1, 2	QEXG01001RA	[M][MC][EZ][XL][XM] only	2

Ref. No.	Part No.	Description	Per/Set
RESISTORS			
R1, 2	ERDS2TJ103	10KΩ	2
R3~6	ERDS2TJ472	4.7KΩ	4
R7~10	ERDS2TJ101	100Ω	4
R11	ERDS2TJ103	10KΩ	1
R12	ERDS2TJ101	100Ω	1
R13	ERDS2TJ222	2.2KΩ	1
R14~19	ERDS2TJ103	10KΩ	6
R20	ERDS2TJ101	100Ω	1
R21	ERDS2TJ221	220Ω	1
R22	ERDS2TJ104	100KΩ	1
R23	ERDS2TJ101	100Ω	1
R26	ERDS2TJ101	100Ω	1
R27	ERDS2TJ221	220Ω	1
R28	ERDS2TJ104	100KΩ	1
R29	ERDS2TJ101	100Ω	1
R31	ERDS2TJ221	220Ω	1
R32	ERDS2TJ331	330Ω	1
R33	ERDS2TJ103	10KΩ	1
R34	ERDS2TJ332	3.3KΩ	1
R35~38	ERDS2TJ103	10KΩ	4
R40	ERDS2TJ103	10KΩ	1
R41	ERDS2TJ102	1KΩ	1
R42	ERDS2TJ154	150KΩ	1
R43, 44	ERDS2TJ103	10KΩ	2
R46	ERDS2TJ102	1KΩ	1
R47, 48	ER0S2TKF1001	1KΩ, ±1%	2
R49	ERDS2TJ472	4.7KΩ	1
R50	ERDS2TJ101	100Ω	1
R51	ERDS2TJ331	330Ω	1
R55	ERDS2TJ105	1MΩ	1
R56	ERDS2TJ472	4.7KΩ	1
R57	ERDS2TJ101	100Ω	1
R58	ERDS2TJ222	2.2KΩ	1
R59	ERDS2TJ103	10KΩ	1
R62	ERDS2TJ682	6.8KΩ	1
R63	ERDS2TJ152	1.5KΩ	1
R64	ERDS2TJ332	3.3KΩ	1
R65	ERDS2TJ472	4.7KΩ	1
R67, 68	ERDS2TJ102	1KΩ	2
R69	ERDS2TJ101	100Ω	1
R70	ERDS2TJ823	82KΩ	1
R71	ERDS2TJ104	100KΩ	1
R72	ERDS2TJ101	100Ω	1
R73	ERDS2TJ563	56KΩ	1
R74	ERDS2TJ184	180KΩ	1
R75	ERDS2TJ101	100Ω	1
R76	ERDS2TJ563	56KΩ	1
R77	ERDS2TJ224	220KΩ	1
R78	ERDS2TJ101	100Ω	1
R79	ERDS2TJ683	68KΩ	1
R80	ERDS2TJ124	120KΩ	1
R81	ERDS2TJ101	100Ω	1
R82	ERDS2TJ124	120KΩ	1
R83	ERDS2TJ683	68KΩ	1
R84	ERDS2TJ101	100Ω	1
R85	ERDS2TJ184	180KΩ	1
R86	ERDS2TJ563	56KΩ	1
R87	ERDS2TJ101	100Ω	1
R88	ERDS2TJ224	220KΩ	1
R89	ERDS2TJ563	56KΩ	1
R90	ERDS2TJ101	100Ω	1
R91	ERDS2TJ104	100KΩ	1
R92	ERDS2TJ823	82KΩ	1
R93, 94	ERDS2TJ334	330KΩ	2
R95	ERDS2TJ472	4.7KΩ	1
R96	ERDS2TJ222	2.2KΩ	1
R97	ERDS2TJ472	4.7KΩ	1
R98~100	ERDS2TJ333	33KΩ	3
R101, 102	ERDS2TJ334	330KΩ	2
R103	ERDS2TJ472	4.7KΩ	1
R104	ERDS2TJ222	2.2KΩ	1
R105	ERDS2TJ472	4.7KΩ	1
R106~108	ERDS2TJ333	33KΩ	3
R116	ERDS2TJ184	180KΩ	1
R117	ERDS2TJ104	100KΩ	1
R120	ERDS2TJ184	180KΩ	1
R121	ERDS2TJ104	100KΩ	1
R122, 123	ERDS2TJ331	330Ω	2
R124	ERDS2TJ681	680Ω	1
R125, 126	ERDS2TJ472	4.7KΩ	2
R127, 128	ERDS2TJ473	47KΩ	2
R132	ERDS2TJ473	47KΩ	1
R134	ERDS2TJ334	330KΩ	1
R135	ERDS2TJ124	120KΩ	1
R137	ERDS2TJ473	47KΩ	1
R138	ERDS2TJ124	120KΩ	1
R139	ERDS2TJ334	330KΩ	1
R149	ERDS2TJ684	680KΩ	1
R150	ERDS2TJ224	220KΩ	1
R151	ERDS2TJ334	330KΩ	1
R152	ERDS2TJ220	22Ω	1
R153	ERDS2TJ331	330Ω	1
R154	ERDS2TJ103	10KΩ	1
R155	ERDS2TJ684	680KΩ	1
R156	ERDS2TJ334	330KΩ	1
R157	ERDS2TJ224	220KΩ	1
R158	ERDS2TJ220	22Ω	1
R159	ERDS2TJ222	2.2KΩ	1
R160, 161	ERDS2TJ102	1KΩ	2
R162	ERDS2TJ222	2.2KΩ	1
R163, 164	ERDS2TJ332	3.3KΩ	2
R169, 170	ERDS2TJ104	100KΩ	2
R171, 172 ⚠ M XM	ERX1ANJPR22S	0.22Ω, 1W, Flame-Proof	2
R173 M XM	ERDS2TJ822	8.2KΩ	1
R174 M XM	ERDS2TJ102	1KΩ	1
R175 M XM	ERDS2TJ151	150Ω	1
R176 ⚠	ERD2FCJ4R7	4.7Ω, 1/4W, Fuse Type	1
R178	ERDS2TJ221	220Ω	1
R179	ERDS2TJ222	2.2KΩ	1
R180	ERDS2TJ223	22KΩ	1
R181, 182	ERDS2TJ102	1KΩ	2
R183	ERDS2TJ473	47KΩ	1
R184	ERDS2TJ472	4.7KΩ	1
R185	ERDS2TJ222	2.2KΩ	1
R186	ERDS2TJ223	22KΩ	1
R187 ⚠	ERD2FCJ4R7	4.7Ω, 1/4W, Fuse Type	1
R188	ERDS2TJ471	470Ω	1
R189	ERDS2TJ684	680KΩ	1
R190	ERDS2TJ223	22KΩ	1
R191	ERDS2TJ102	1KΩ	1
R192	ERDS2TJ473	47KΩ	1
R193	ERDS2TJ472	4.7KΩ	1
R197~199	ERDS2TJ103	10KΩ	3
R200	ERDS2TJ222	2.2KΩ	1
R201, 202	ERDS2TJ103	10KΩ	2
R204	ERDS2TJ103	10KΩ	1
R206, 207 ⚠	ERQ14AJ2R0	2Ω, 1/4W, Fuse Type	2

Ref. No.	Part No.	Description	Per/Set
		CAPACITORS	
C1, 2	ECKR1E473ZV	0.047µF	2
C3	ECRR1H104ZF	0.1µF	1
C4	ECEA0JKA101	100µF, 6.3V	1
C5	ECKR1E473ZV	0.047µF	1
C6	ECEA1HKA010	1µF, 50V	1
C7	ECKR1E473ZV	0.047µF	1
C10	ECKR1E473ZV	0.047µF	1
C11	EECF5R5U105	1F, 5.5V, Memory Back-up	1
C13	ECKR1E473ZV	0.047µF	1
C14, 15	ECCR1H030C	3pF	2
C16~18	ECKR1E473ZV	0.047µF	3
C20~22	ECKR1E473ZV	0.047µF	3
C23	ECRR1H104ZF	0.1µF	1
C24	ECCR1H470J	47pF	1
C25	ECCR1H680J	68pF	1
C26, 27	ECRR1H104ZF	0.1µF	2
C29	ECCR1H331J	330pF	1
C30, 31	ECCR1H101J	100pF	2
C35	ECEA0JKA470	47µF, 6.3V	1
C36	ECKR1E473ZV	0.047µF	1
C37, 38	ECCR1H220J	22pF	2
C39	ECKR1E473ZV	0.047µF	1
C40	ECEA0JKA470	47µF, 6.3V	1
C42	ECKR1E473ZV	0.047µF	1
C44	ECEA1CKN100	10µF, 16V	1
C48	ECKR1E473ZV	0.047µF	1
C50, 51	ECKR1E473ZV	0.047µF	2
C53	ECKR1E473ZV	0.047µF	1
C54~61	ECQG1H222KZ	0.0022µF	8
C62	ECCR1H470J	47pF	1
C63	ECQG1H102KZ	0.001µF	1
C64	ECCR1H471J	470pF	1
C65	ECQG1H222KZ	0.0022µF	1
C66	ECQG1H102KZ	0.001µF	1
C67, 68	ECCR1H471J	470pF	2
C69	ECCR1H680J	68pF	1
C71	ECCR1H470J	47pF	1
C72	ECCR1H471J	470pF	1
C73, 74	ECQG1H102KZ	0.001µF	2
C75	ECQG1H222KZ	0.0022µF	1
C76, 77	ECCR1H471J	470pF	2
C78	ECCR1H680J	68pF	1
C82	ECEA1CKA101	100µF, 16V	1
C83, 84	ECEA1HKA010	1µF, 50V	2
C85, 86	ECEA1CKA100	10µF, 16V	2
C87	ECEA1CKA101	100µF, 16V	1
C89	ECEA0JKA331	330µF, 6.3V	1
C90	ECEA1EKA4R7	4.7µF, 25V	1
C91	ECKR1E473ZV	0.047µF	1
C92	ECEA1CKN100	10µF, 16V	1
C93	ECEA0JKA331	330µF, 6.3V	1
C98, 99	ECEA1HKN010	1µF, 50V	2
C105, 106	ECCR1H470J	47pF	2
C107	ECQG1H332KZ	0.0033µF	1
C108	ECQG1H102KZ	0.001µF	1
C109	ECRR1H104ZF	0.1µF	1
C111	ECEA1CKA470	47µF, 16V	1
C112, 113	ECQG1H472KZ	0.0047µF	2
C114	ECEA1HKA010	1µF, 50V	1
C115	ECKR1E473ZV	0.047µF	1
C116	ECEA1CKA470	47µF, 16V	1
C117	ECEA1HKA010	1µF, 50V	1
C118	ECCR1H100D	10pF	1
C120	ECCR1H100D	10pF	1
C122, 123	ECCR1H220J	22pF	2
C127	ECRR1H104ZF	0.1µF	1
C130, 131	ECRR1H104ZF	0.1µF	2
C132	ECEA1HKA010	1µF, 50V	1
C134	ECEA1HKA010	1µF, 50V	1
C135	ECCR1H471J	470pF	1
C136	ECSF1EE106	10µF, 25V	1
C138, 139	ECKR1E473ZV	0.047µF	2
C142	ECKR1E473ZV	0.047µF	1
C160	ECEA1CKA470	47µF, 16V	1
C203	ECEA0JKA101	100µF, 6.3V	1
C204, 205	ECRR1H104ZF	0.1µF	2
C207	ECQM1H103KV	0.01µF	1
C208	ECQM1H223KV	0.022µF	1
C209	ECQM1H103KV	0.01µF	1
C210	ECQM1H223KV	0.022µF	1

HP HEADPHONES CIRCUIT

Ref. No.	Part No.	Description	Per/Set
		COIL	
L1	SLQG15W34DPQ	Coil	1
		JACKS	
JK1, 2	SJJG100A	Headphones	2
		RESISTORS	
R1~4 ⚠	ERG1ANJP680S	68Ω, 1W, Flame-Proof	4
		CAPACITORS	
C1, 2	ECCR1H331J	330pF	2
C3	ECRR1H104ZF	0.1µF	1

MKB-1 MANUAL KEYBOARD 1 CIRCUIT

Ref. No.	Part No.	Description	Per/Set
		INTEGRATED CIRCUITS	
IC1	MN50020PGV	Gate Array	1
IC2	MN1231	1K bit Programmable ROM	1
		DIODES	
S D1~88	MA162A	MA150IR (SUB. Part)	88
		OSCILLATOR	
X1	EF0FC4004A3	4MHz, Ceramic Oscillator	1

	Ref. No.	Part No.	Description	Per/Set
		SWITCHES		
	S1~14	SSPG7002A	Rubber Switch (7 pcs. on one)	2
	S15~44	SSPG6002A	Rubber Switch (6 pcs. on one)	5
		RESISTORS		
	R1	ERDS2TJ101	100Ω	1
	R2	ERDS2TJ103	10KΩ	1
	R3	ERDS2TJ222	2.2KΩ	1
	R4	ERDS2TJ472	4.7KΩ	1
		CAPACITORS		
	C1	ECCR1H681J	680pF	1
	C2	ECKR1E473ZV	0.047μF	1
	C3	ECCR1H681J	680pF	1
	C4	ECEA1CU470	47μF, 16V	1

MKB2 MANUAL KEYBOARD 2 CIRCUIT

	Ref. No.	Part No.	Description	Per/Set
		DIODES		
S	D89~176	MA162A	MA150IR (SUB. Part)	88
		COMPONENT COMBINATION		
	Z1	EXBP88332JM	3.3KΩ×8	1
		SWITCHES		
	S45~58	SSPG7002A	Rubber Switch (7 pcs. on one)	2
	S59~88	SSPG6002A	Rubber Switch (6 pcs. on one)	5

CPR CONTROL PANEL RIGHT CIRCUIT

	Ref. No.	Part No.	Description	Per/Set
		INTEGRATED CIRCUITS		
	IC1	SVIGM603A121	Gate Array	1
	IC2~5	SVIGM74LS07	Hex Buffers (O.C.)	4
		TRANSISTORS		
	Q1~4	2SA830SB		4
		DIODES		
	D1~7, 11, 13, 16~27, 31~43, 45~49	MA165TA5		38
	D50~57, 61, 63, 66~77, 84, 87, 89~94, 96~102, 105	LN282R	LED (Red)	38
	D81~83, 85, 86, 88, 104	LN382G	LED (Green)	7
		DISPLAY		
○	LD1	LB603VF	Triple 8 Segments Display	1
		SWITCHES		
	S1~7, 11, 13, 16~27, 31~43, 45, 47, 48	SSHG1046A	Push switch	37
		IC PROTECTOR		
○	IP1	ICP-N10T104		1
		RESISTORS		
	R1	ERDS2TJ102	1KΩ	1
	R2	ERDS2TJ184	180KΩ	1
	R3	ERDS2TJ221	220Ω	1
	R4	ERDS2TJ103	10KΩ	1
	R5	ERDS2TJ152	1.5KΩ	1
	R6~17	ERDS2TJ103	10KΩ	12
	R18~39	ERDS2TJ470	47Ω	22
		CAPACITORS		
	C1	ECEA0JKA101	100μF, 6.3V	1
	C2	ECRR1H104ZF	0.1μF	1
	C3, 4	ECCR1H101J	100pF	2
	C5	ECEA1HKA010	1μF, 50V	1
	C6~8	ECRR1H104ZF	0.1μF	3

FDCN FD CONNECTOR CIRCUIT

	Ref. No.	Part No.	Description	Per/Set
		COMPONENT COMBINATIONS		
	ZC1, 2	EXFP8470MW	47pF×8	2
		COILS		
	L1	SLQG15W33AP	Coil	1
	L2, 3	SLQG10W10D1P	Coil	2
		WIRE		
	W1	SWEG640A		1
		CAPACITOR		
	C1	ECRR1H104ZF	0.1μF	1

CPL CONTROL PANEL LEFT CIRCUIT

	Ref. No.	Part No.	Description	Per/Set
		INTEGRATED CIRCUITS		
	IC1	SVIGM603A121	Gate Array	1
	IC2, 3	SVIGM74LS07	Hex Buffers (O.C.)	2
		TRANSISTORS		
	Q1~4	2SA830SB		4
		DIODES		
	D1~20, 24~45	MA165TA5		42
	D46~56, 60~77	LN282R	LED (Red)	29
		SWITCHES		
	S4~24	SSHG1046A	Push switch	21
	S25~29	SSSG1011A	Balance	5
		IC PROTECTOR		
○	IP1	ICP-N10T104		1
		VARIABLE RESISTOR		
	VR1	EVD06510B24G	20KΩ B, Main Volume	1
		RESISTORS		
	R1	ERDS2TJ102	1KΩ	1
	R2	ERDS2TJ184	180KΩ	1
	R3	ERDS2TJ221	220Ω	1
	R4	ERDS2TJ103	10KΩ	1
	R5	ERDS2TJ152	1.5KΩ	1
	R6~17	ERDS2TJ103	10KΩ	12
	R18~21	ERDS2TJ470	47Ω	4
	R23~28	ERDS2TJ470	47Ω	6
		CAPACITORS		
	C1	ECEA0JKA101	100µF, 6.3V	1
	C2	ECRR1H104ZF	0.1µF	1
	C3, 4	ECCR1H101J	100pF	2
	C5	ECEA1HKA010	1µF, 50V	1
	C6~8	ECRR1H104ZF	0.1µF	3

CPSQ SEQUENCER CONTROL CIRCUIT

	Ref. No.	Part No.	Description	Per/Set
		INTEGRATED CIRCUITS		
	IC1, 2	SVIGM74LS07	Hex Buffers (O.C.)	2
		DIODES		
	D1, 2, 13~25, 29~33	LN282R	LED (Red)	20
	D3~12, 26, 28, 34~36	LN382G	LED (Green)	15
	D37~50, 52~56	MA165TA5		19

	Ref. No.	Part No.	Description	Per/Set
		SWITCHES		
	S37~50, 52~56	SSHG1049A	Push Switch	19
		RESISTORS		
	R1~9	ERDS2TJ470	47Ω	9
		CAPACITOR		
	C1	ECRR1H104ZF	0.1µF	1

ACP AC POWER SUPPLY CIRCUIT

	Ref. No.	Part No.	Description	Per/Set
		LINE FILTER		
	L1 ⚠	SLTGLF3	Line Filter	1
		JACK		
	JK1 XL XR ⚠	SJSD16	AC IN	1
	JK1 ⚠	SJS9236	AC IN, Other areas	1
		SWITCH		
	S1 ⚠	SSRG100A	Voltage Selector, Except for [M] [MC] [XM] [EH]	1
		FUSES		
	F1 M MC XM ⚠	XBA1C40NU100	4A, 125V	1
	F2 EH ⚠	XBA2C12TB0	T1.25A, 250V	1
	F1 ⚠	XBA2C25TB0	T2.5A, 250V } Other areas	1
	F2, 3 ⚠	XBA2C12TB0	T1.25A, 250V } Other areas	2
		CAPACITORS		
	C1 ⚠	ECKCVA1472MF	4700pF, Line-Capacitor	1
	C2 ⚠	ECQU2A104MN	0.1µF, 250V, Across-the Line Capacitor	1

AS AMP & POWER SUPPLY CIRCUIT

	Ref. No.	Part No.	Description	Per/Set
		INTEGRATED CIRCUITS		
	IC1	SVIGS4172M2M	Power Amplifier	1
	IC2	SVIGM5291P	Switching Regulator	1
	IC3	SVIGM5F7815	+15V Voltage Regulator	1
	IC4	SVIGM5F7915	−15V Voltage Regulator	1

	Ref. No.	Part No.	Description	Per/Set
		TRANSISTORS		
S	Q1, 2	2SC2320LFG	2SC1310FG (SUB. Part)	2
	Q3	2SA1643		1
		DIODES		
	D1, 2 ⚠	SVDGERA1502Y	Rectifier	2
S	D3~6 ⚠	SVDGS3V20-15	Rectifier	4
	D11	SVDGRK14S	Diode	1
	D12	MA2062LF	Zener, 6.2V	1
	D13	MA165TA5		1
		COIL		
	L2	SLCG2A121TZ	Coil	1
		WIRE		
	W1	SWEG630A	[EZ] [M] [MC] [XL] [XM] only	1
		RESISTORS		
	R1~3	ERDS2TJ103	10KΩ	3
	R4	ERDS2TJ472	4.7KΩ	1
	R5	ERDS2TJ221	220Ω	1
	R6, 7	ERDS2TJ223	22KΩ	2
	R8	ERDS2TJ473	47KΩ	1
	R9	ERDS2TJ472	4.7KΩ	1
	R10 ⚠	ERQ14AJ2R0P	2Ω, 1/4W, Fuse Type	1
	R11 ⚠	ERX1ANJPR22S	0.22Ω, 1W, Flame-Proof	1
	R12	ERDS2TJ470	47Ω	1
	R13 ⚠	ERG1ANJP221S	220Ω, 1W, Flame-Proof	1
	R14	ER0S2TKF3571	3.57KΩ, ±1%	1
	R15	ER0S2TKF1001	1KΩ, ±1%	1
	R16 ⚠	ERD2FCG101	100Ω, 1/4W, Fuse Type	1
	R17, 18	ERDS2TJ153	15KΩ	2
	R19	ERDS2TJ102	1KΩ	1
	R20	ERDS2TJ473	47KΩ	1
	R21	ERDS2TJ222	2.2KΩ	1
	R22, 23	ERDS2TJ152	1.5KΩ	2
	R24 ⚠	ERD25FVJ4R7	4.7Ω, 1/4W, Flame-Proof	1
	R25, 26	ERDS2TJ153	15KΩ	2
	R27	ERDS2TJ102	1KΩ	1
	R28	ERDS2TJ473	47KΩ	1
	R29, 30	ERDS2TJ152	1.5KΩ	2
	R31	ERDS2TJ222	2.2KΩ	1
	R32~34	ERDS2TJ102	1KΩ	3
	R35	ERDS2TJ104	100KΩ	1
	R36 ⚠	ERD25FVJ4R7	4.7Ω, 1/4W, Flame-Proof	1
	R37, 38	ERDS2TJ333	33KΩ	2
	R39	ERDS2TJ682	6.8KΩ	1
	R41	ERDS2TJ221	220Ω	1
		CAPACITORS		
	C3	ECEA1VU222	2200µF, 35V	1
	C4	ECEA1VU332	3300µF, 35V	1
	C6	ECEA1VU332	3300µF, 35V	1
	C7	ECEA0JKA470	47µF, 6.3V	1
	C8	ECEA1HKA010	1µF, 50V	1
	C9	ECEA1VKG100	10µF, 35V	1
	C10	ECCR1H101J	100pF	1
	C11	ECEA0JU102	1000µF, 6.3V	1
	C12	ECKR1E473ZV	0.047µF	1
	C13	ECQV1H474JZ	0.47µF	1
	C14	ECCR1H101J	100pF	1
	C15	ECEA1EKA4R7	4.7µF, 25V	1
	C16	ECEA1EKA470	47µF, 25V	1

	Ref. No.	Part No.	Description	Per/Set
	C17	ECRR1H104ZF	0.1µF	1
	C18	ECQV1H474JZ	0.47µF	1
	C19	ECCR1H101J	100pF	1
	C20	ECEA1EKA4R7	4.7µF, 25V	1
	C21	ECEA1EKA470	47µF, 25V	1
	C22	ECEA1VKG100	10µF, 35V	1
	C23	ECRR1H104ZF	0.1µF	1
	C24, 25	ECQB1H223JZ	0.022µF	2
	C28	ECEA1HU330	33µF, 50V	1
	C30, 31	ECEA1VKG100	10µF, 35V	2
	C33	ECEA50Y22	22µF, 50V	1
	C34, 35	ECEA50Y3R3	3.3µF, 50V	2
	C36	ECEA50Y22	22µF, 50V	1
	C37 ⚠	ECQE1A104M6	0.1µF, 125V, [EZ] [M] [MC] [XL] [XM] only	1

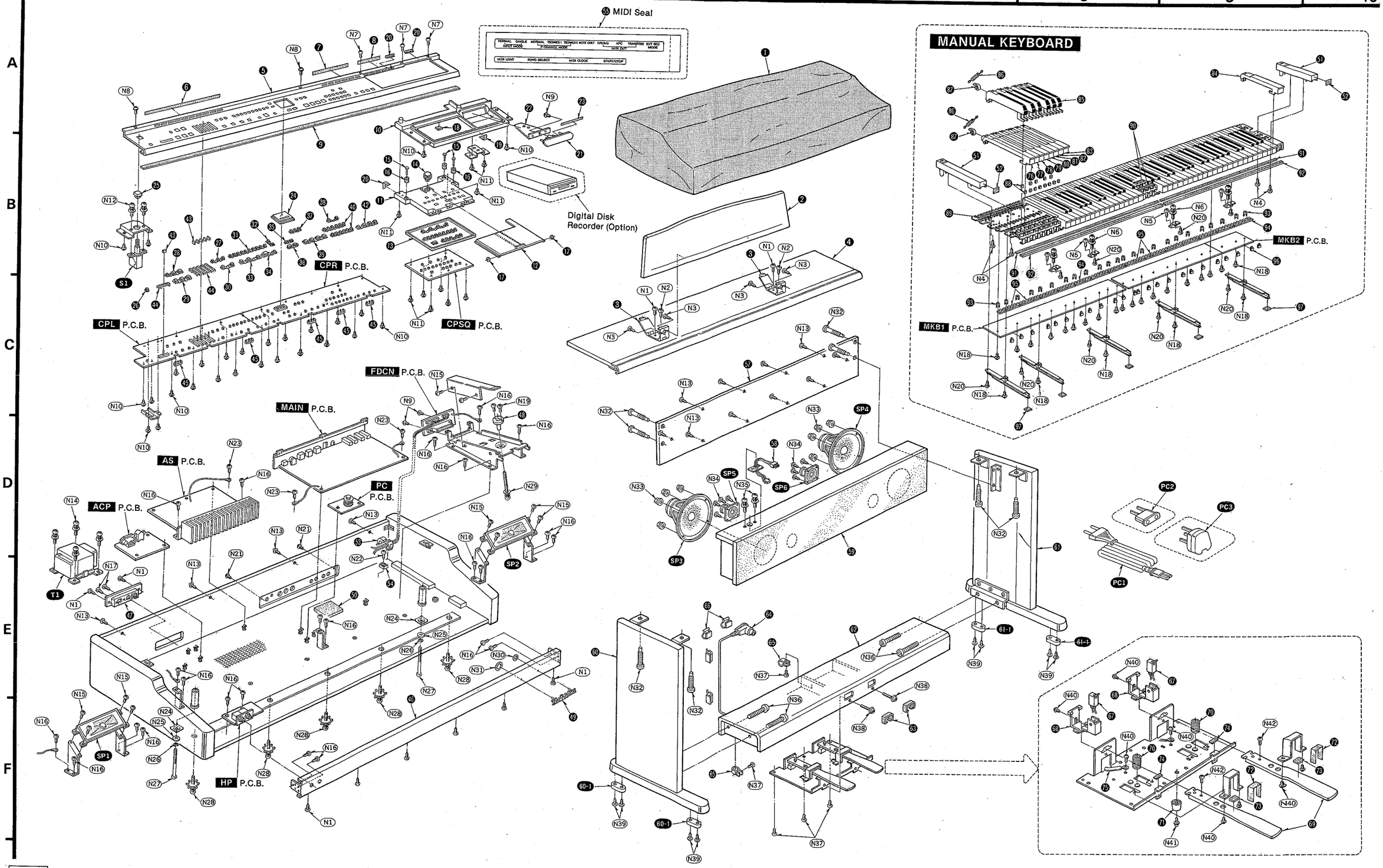
PC PEAK CANCELLER CIRCUIT

	Ref. No.	Part No.	Description	Per/Set
		COIL		
	L1	SLCSC331KU	330µH	1
		RESISTOR		
○	R1 ⚠	ERF5ZXJ560	56Ω, 5W, Flame-Proof	1
		CAPACITOR		
	C1	ECEA50Y6R8	6.8µF, 50V	1

■ WIRING PARTS

	Ref. No.	Part No.	Description	Per/Set
○	W1	QEXG06011ZA	Connector with Wire	1
	W2	QEXG03017ZA	Connector with Wire	1
	W3	SWKG0874SSA	Connector with Wire	1
○	W4	QEXG03027ZA	Connector with Wire	1
○	W5	QEXG09010ZA	Connector with Wire	1
○	W7	QEXG10006SSA	Connector with Wire	1
	W8	SWKG04103SSB	Connector with Wire	1
○	W9	QEXG15008SSA	Connector with Wire	1
	W11	SWKG1516SSA	Connector with Wire	1
○	W13	QEXG16008SSA	Connector with Wire	1
○	W14	QEXG11007SSA	Connector with Wire	1
○	W15	QEXG13001SSA	Connector with Wire	1
	W16	SWKG151SSA	Connector with Wire	1
○	W17	QEXG06012ZA	Connector with Wire	1
○	W18	QEXG05019STA	Connector with Wire	1

EXPLODED VIEWS OF CABINET



REPLACEMENT PARTS LIST.....Cabinet and Chassis Parts

Notes:

1. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. ○ mark are new parts.
3. For part No. with area mark, check the area when placing an order.

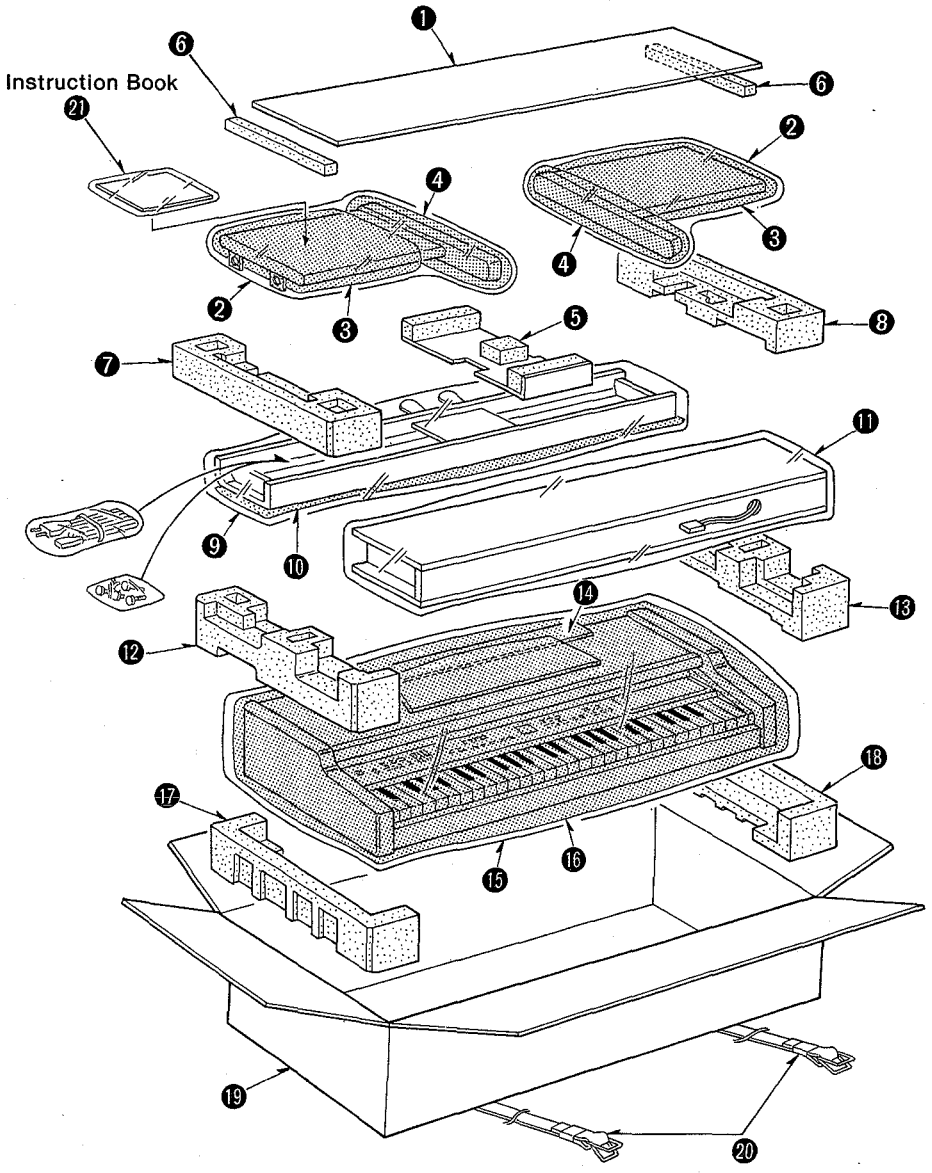
■ CABINET & CHASSIS PARTS

	Ref. No.	Part No.	Description	Per/Set
	SWITCH			
	S1 ⚠	SSHG1050A	Power Switch	1
	SPEAKERS			
	SP1, 2	EAS15S09A	13cm×6cm, 8Ω	2
	SP3, 4	SASG16PL03-F	16cm, 8Ω	2
	SP5, 6	EAS65PH31A	6.5cm, 8Ω	2
	TRANSFORMERS			
	T1 M XM MC ⚠	SLTG5M31	Power Transformer	1
	T1 Others ⚠	SLTG5M30	Power Transformer	1
	POWER CORD & PLUG			
	PC1 EK XS XD ⚠	SJAG39	AC Power Cord	1
	PC1 EH ⚠	SJAG41	AC Power Cord	1
	PC1 XL XR ⚠	SJAG61	AC Power Cord	1
	PC1 M XM MC ⚠	SJAG62	AC Power Cord	1
	PC1 Others ⚠	SJAG65	AC Power Cord	1
	PC2 X ⚠	SJP5213-1	Attachment Plug, [X] only	1
	PC3 XD ⚠	SJPG1350A	Power Plug, [XD] only	1
	CABINET PARTS			
○	1	QFCG010AA	Dust Cover	1
○	2	QGAG1009AA	Music Rack	1
	3	SBLG51A	Stay	2
○	4	QKQGA028AA	Top Cover	1
○	5	QGPG0014AB	Control Panel	1
○	6	QMFG4028AA	Net	1
○	7	QMFG4029AA	Net	1
○	8	QMFG4030AA	Net	1
	9	SHSG3430A	Felt	1
○	10	QGPG0015AB	Subpanel Frame	1
○	11	QGPG0016AH	Subpanel	1
○	12	QGPG0017AA	Subpanel Cover	1
○	13	QGUG1076AA01	Button Ass'y	1
○	14	RDG5782ZB	Gear	1
○	15	RMS0123	Pin	3
○	16	QMRG7013AA	Roller	3
○	17	QMRG7012AA	Roller	2
○	18	QMFG4033AA	Felt	1
	19	QMFG1026AA	Felt	1
○	20	QMFG4032AA	Felt	3
○	21	QGPG0018AB	Cover	1
○	22	QMAG0008BA	Bracket	1
○	23	QMFG4035AA	Felt	1
○	24	QGPG0019AA	LED Panel	1
	25	QGUG1040AA	Button, Power Switch	1
○	26	QGUG1059AA	Button	1
○	27	QGUG1060AA	Button	1
○	28	QGUG1061AA	Button	1
○	29	QGUG1062AA	Button	1
○	30	QGUG1063AA01	Button	1
○	31	QGUG1064AA	Button	1
○	32	QGUG1065AA	Button	1
○	33	QGUG1066AA	Button	1
○	34	QGUG1067AA01	Button	1
○	35	QGUG1068AA01	Button	1
○	36	QGUG1069AA01	Button	1
○	37	QGUG1070AA	Button	1
○	38	QGUG1071AA	Button	1
○	39	QGUG1072AA01	Button	1
○	40	QGUG1073AA	Button	2
○	42	QGUG1075AA	Button	1
	43	SBNG7050A	Knob	6
	44	SGEG260A	Ornament	6
○	45	QMGG010AA	Spacer	5
○	46	QKSGE005GB	Front Panel	1
○	47 M XM MC EH	QGKG0019HB	Jack Panel	1
○	47 Others	QGKG0019GB	Jack Panel	1
○	48	SHRG9921A	Spacer	1
	49	SGBG160B	Badge	1
	50	SHRGA7280A	Cushion	1
	51	SGWG2200B	End Cover Panel	2
	52	SHSG3690A	Felt	2
	53	QLZG001A	Core M XM MC	1
	54	SHRG1270A	Mounting Base EZ XL	1
○	55	QQLG021BA	MIDI Seal	1
	56			0
	STAND			
○	57	QKUG1008AA	Rear Board	1
○	58	QEXG06011ZA	Connector with Wire	1
○	59	QYKG046AA	Speaker Box	1
○	60	QKQGB118AA	Left Plank Ass'y	1
	60-1	[SHRG2130B	Foot	2
○	61	QKQGB119AA	Right Plank Ass'y	1
	61-1	[SHRG2130B	Foot	2
○	62	QKQGM008AA	Pedal Box Ass'y	1
	63	QMFG1039AA	Felt	2
○	64	QJLG003AA	Pedal Cord	1
	65	SHRG1230A	Cord Clamper	2
	66	SHRG9620A	Cord Clamper	5
	67	SRDSMLS-2	Switch	2
	68	QMWG8005AB	Switch Cover	2
	69	STBG3115A	Pedal Arm	2
	70	SUSG441A	Spring	2
	71	SKLG160A	Foot	1
	72	SHSG2750A	Felt	2
	73	SHSG2770A	Felt	2
	74	SHSG2790A	Felt	2
	75	SUWG219	Binder	1

Ref. No.	Part No.	Description	Per/Set
		MANUAL KEYBOARD	
76	STBG1938A	White Key (First Octave A Key)	1
77	STBG1948A	White Key (B Key)	8
78	STBG1958A	White Key (C Key)	7
79	STBG1968A	White Key (D Key)	7
80	STBG1978A	White Key (E Key)	7
81	STBG1988A	White Key (F Key)	7
82	STBG1998A	White Key (G Key)	7
83	STBGA1018A	White Key (A Key)	7
84	STBGA1128A	White Key (Top Octave C Key)	1
85	STBG2914A	Black Key	36
86	QMBG002AA	Spring	88
87	STBG9180B	Fulcrum	88
88	SHGG9091A	Key Guide Rubber	88
89	SHRG7770A	Sponge	1
90	QMFG1019BA	Felt	2
91	QMFG1023BA	Felt	2
92	QMFG1021CA	Felt	2
93	SHRG9760A	P.C.B. Spacer	24
94	SSPG6002A	Rubber Switch (6 pcs. on one)	10
95	SSPG7002A	Rubber Switch (7 pcs. on one)	4
96	SHRG9751A	P.C.B. Spacer	24
97	SHSG5750A	Felt	5
		SCREWS & WASHERS	
N1	XTB35+12AFVC	Screw	10
N2	XSC3+12FVCS	Screw	2
N3	XTB35+10AFVC	Screw	4
N4	XTB4+14A	Screw	4
N5	XTB4+12A	Screw	4
N6	XYN5+F16	Screw with Washer	4
N7	XTV3+12GFZ	Screw	3

Ref. No.	Part No.	Description	Per/Set
N8	XTW3+10JFZ	Screw	2
N9	XTW3+10Q	Screw	3
N10	XTW3+8T	Screw	27
N11	XTB3+12G	Screw	10
N12	XYN3+F6FZ	Screw with Washer	2
N13	XTT4+25AFVC	Screw	14
N14	XYN4+F30FZ	Screw with Washer	4
N15	XTB3+10B	Screw	10
N16	XTB35+12A	Screw	24
N17	XTB3+14GFVC	Screw	2
N18	XTW3+10T	Screw	24
N19	XTS3+6B	Screw	2
N20	XTV3+8C	Screw	9
N21	QHDG004AB	Screw	2
N22	XTB3+10A	Screw (M XM MC)	1
N23	SNEG2660A	Screw (EZ XL)	3
N24	SNEG150A	Washer	2
N25	XWG5J12	Washer	2
N26	XWA5B	Washer	2
N27	XSN5+85	Screw	2
○ N28	QHDG006AA	Screw with Washer	5
N29	XYN4+F65	Screw with Washer	1
N30	SNEG1770A	Retaining Ring	1
N31	SNEG1780A	Retaining Ring	1
○ N32	QHDG009AA	Screw Bolt (Brown)	8
N33	SNE499-1	Nut	8
N34	XTT4+12A	Screw	8
N35	QHDG004AA	Screw	2
N36	SNEG2280A	Screw Bolt (Black)	4
N37	XTB35+14A	Screw	5
N38	XYN4+F16FZ	Screw with Washer	2
N39	XTW3+16JFZ	Screw	8
N40	XTW3+8C	Screw	8
N41	XYN4+C25	Screw with Washer	1
N42	XSN4+8	Screw	2

PACKING



■ PACKING PARTS

	Ref. No.	Part No.	Description	Per/Set
○	1	QPGG0078AA	Top Cardboard	1
	2	SPHG2050A	Polyethylene Bag	2
	3	SPHG1580A	Protection Sheet	2
	4	SPHG1730A	Protection Sheet	2
○	5	QPNG0140AA	Pad	1
○	6	QPNG0149AA	Spacer	2
○	7	QPNG0141AA	Pad (Upper, Left)	1
○	8	QPNG0142AA	Pad (Upper, Right)	1
	9	QPFG012AA	Polyethylene Bag	1
	10	QPHG020AA	Protection Sheet	1
	11	SPHG1570A	Polyethylene Bag	1
○	12	QPNG0147AA	Pad (Center, Left)	1
○	13	QPNG0148AA	Pad (Center, Right)	1
○	14	QPGG0073AA	Spacer	1
	15	QPFG008AA	Polyethylene Bag	1

	Ref. No.	Part No.	Description	Per/Set
	16	SPHG2120A	Protection Sheet	1
○	17	QPNG0145AA	Pad (Lower, Left)	1
○	18	QPNG0146AA	Pad (Lower, Right)	1
○	19	QPGG0077AA	Carton	1
	20	SPSG40A	Band	2
		INSTRUCTION BOOK		
○	21 EN	QQFGPR250AA	Instruction Book	1
○	21 M	QQFGPR250CA	Instruction Book	1
○	21 EZ	QQFGPR250EA	Instruction Book	1
○	21 EW	QQFGPR250FA	Instruction Book	1
○	21 EF EH	QQFGPR250GA	Instruction Book	1
○	21 Others	QQFGPR250DA	Instruction Book	1